

Publications of the Carnegie Museum, Serial No. 58.

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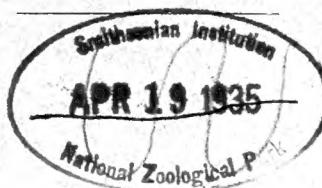
VOL. IV. NO. 4.

W. J. HOLLAND, EDITOR.

CANCELLATION
AMERICAN EDITION
C. 1909
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A CATALOG OF THE FISHES OF FORMOSA.

BY DAVID STARR JORDAN AND ROBERT EARL RICHARDSON.



PITTSBURGH.

PUBLISHED BY THE BOARD OF TRUSTEES OF THE
CARNEGIE INSTITUTE.

AUGUST 28, 1909.

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MEMOIRS OF THE CARNEGIE MUSEUM.

VOL. IV.

NO. 4

A CATALOG OF THE FISHES OF THE ISLAND OF FORMOSA, OR
TAIWAN, BASED ON THE COLLECTIONS OF DR.
HANS SAUTER.

BY DAVID STARR JORDAN AND ROBERT EARL RICHARDSON.

In the year 1906 a large collection of the market-fishes of the island of Formosa was made by Dr. Hans Sauter. These were sent to the writers for identification, and were at our suggestion purchased by the Carnegie Museum, in which they are now preserved. A number of duplicates have been presented to the Museum of Stanford University in California.

This collection was obtained in the port of Takao, or Takow, on the southwestern coast of the island of Formosa, called in Japanese Taiwan. It is in excellent condition, and gives a good representation of the market-fishes of Formosa.

For the sake of completeness we have included in this list the fishes recorded by Jordan and Evermann in a paper entitled "Notes on a Collection of Fishes from the Island of Formosa" (Proceedings U. S. National Museum, Vol. XXV, 1902, pp. 315-368), and also the species recorded by Günther, Regan, and others, which are preserved in the British Museum.

We desire to acknowledge the courtesy of the authorities of the United States National Museum, who have permitted us herewith to reproduce the figures of those species, which were given in the paper referred to above. The plates accompanying this article were drawn by Mr. William Sackston Atkinson.

The following species are here described as new to science :

<i>Pristiurus sauteri,</i>	<i>Scolopsis eriomma,</i>
<i>Raja hollandi,</i>	<i>Pseudotolithus brunneolus,</i>
<i>Leptocephalus ectenurus,</i>	<i>Hemipteronotus evides,</i>
<i>Ophichthus evermanni,</i>	<i>Glossogobius abacopus,</i>
<i>Gymnothorax leucostigma.</i>	

As noticed by Jordan and Evermann, the fauna of Taiwan bears close relation to that of Southern China, and also to that of Southern Japan. In the main, however, the fauna is tropical, a large proportion of the species being found in India and the Philippines. The coral-reef species of Formosa are still unknown, except as recorded from the Riu Kiu Islands, which lie to the northward. Few of the species of Central Japan extend their range southward to Taiwan.

Family SCYLLIORHINIDÆ.

1. **Cephaloscyllium umbratile** Jordan & Fowler.

One specimen from Takao, measuring two feet to end of tail.

2. **Pristiurus sauteri** sp. nov. (Plate LXIII, Fig. 1.)

Body not so slender as that of *Pristiurus eastmani* of Japan; head measured to first gill-opening 6 in total length; depth equal to half distance between tip of snout and fourth gill-opening; snout $2\frac{1}{4}$ in head; front and back edge of each nostril with a pointed flap; these crossing and closing the nostril at middle; entire width of one nostril equal to the internarial space and almost exactly twice the distance of the inner angle of nostril from mouth; width of mouth slightly greater than length of snout and about equal to interorbital space; teeth each with a median long cusp, on either side of which is a cusp of about half its length; each short cusp may or may not have at its base one or two rudimentary cusps; roof of mouth and tip of tongue with minute prickles; spiracles directly behind eye and distant slightly less than their diameter from it; distance from first to fifth gill-opening equal to distance from spiracle to first opening.

Scales minute, each with a strong central cusp, on each side of which is a rudiment, and with an evident median keel; upper edge of tail with a low keel beginning a little less than two eye-lengths behind second dorsal and extending backward to merge into upper lobe of caudal fin; this keel armed on each side with a row of enlarged scales, between which are four rows of ordinary scales.

First dorsal originating over back of base of ventrals, its base reaching nearly an eye-length farther back than base of ventrals; origin of second dorsal a little behind middle of base of anal; second dorsal only a little, but distinctly, smaller than first; free edges of both dorsals nearly straight; caudal with a shallow notch on under side near tip; width of ventral base equal to distance in front of eye to middle of spiracle; inner distance between bases of pectorals equal to length of eye; free margin of pectorals straight or slightly concave; tip of anal a little short of a vertical from tip of second dorsal.

Color uniform brownish on back and upper part of sides, paler below; first and second dorsals black on upper anterior half, white on posterior third; upper lobe of caudal with a broad blackish margin; pectorals dark brownish anteriorly above, whitish behind and on free margin; ventrals and anal with rather indistinct pale margins.

Six specimens, twelve to fourteen inches long, from Takao. The species is apparently close to *Parmaturus pilosus* Garman from Japan, but it seems to differ from the latter in the insertion of the first dorsal and in the coloration of the fins.

We agree with Regan that *Parmaturus* is not recognizably distinct from the European genus *Pristiurus*.

Family ORECTOLOBIDÆ.

3. ***Chiloscyllium indicum* (Gmelin).**

Formosa (Jordan & Evermann).



FIG. 1. *Chiloscyllium indicum* (Gmelin). (After Jordan & Evermann, Proc. U. S. N. M., Vol. 25, p. 317.)

4. ***Orectolobus japonicus* Regan.**

Formosa (Regan).

Family CARCHARIIDÆ.

5. ***Scoliodon walbeehmi* (Bleeker).** (Plate LXIII, fig. 2.)

(Native name *Soo hii*, = "sandfish.")

One specimen from Takao, thirty-five inches long to end of tail. Another specimen, eleven inches long, and figured by us, may represent a different species, having the mouth characters of *S. walbeehmi*, but the tail much longer. Its description follows:

Head 5 times in total length; depth 5 in length to base of ventrals; eye $2\frac{3}{4}$ in interorbital space, which is contained $2\frac{1}{6}$ in head (to first gill-opening); length of snout from front margin of mouth equal to distance from back of orbit to second gill-opening; a short labial groove, equal to width of nostril, on upper jaw; lower

jaw with a groove a little more than half that length; distance between nostrils a little more than half interorbital space and less than twice eye; teeth not yet appearing through the gums; scales apparently as usual in *Scoliodon*, but little developed in the specimen, the body being smooth in places when rubbed forward with finger; base of first dorsal equal to distance from eye to first gill-opening, its middle almost exactly half-way between ventrals and last gill-opening; second dorsal inserted over back of anal; caudal noticeably longer than in specimens of *S. walbeehmi* of the same size, the distance from the pit to the notch on under side near tip equal to length of head to second gill-opening; posterior margin of pectoral slightly concave; color bluish-olive above, pale below; free margin of first dorsal and upper and lower edge of caudal black.

The above description is based on a single young specimen, eleven inches long apparently very recently a foetus (see figure), from Takao. Except for the smoother body, absence of teeth and longer tail (all foetal characters?) the specimen does not seem to differ from specimens of *Scoliodon walbeehmi* from Manila of the same size. One specimen of *S. walbeehmi* from Manila one-fourth inch shorter in total length has the scales evident over whole body and fins, the teeth well through, and the umbilical scar absorbed. If our specimen is a recent foetus of this species, as it may be, it is then necessary to assume either that it is somewhat overgrown for its age, or that a marked shortening up of both body and tail occurs at about the time the teeth appear and the scales attain their full development.

6. **Triakis scylium** Müller & Henle.

Formosa (Jordan & Evermann).

7. **Galeus japonicus** Müller & Henle.

Formosa (Jordan & Evermann).

Family SPHYRNIDÆ.

8. **Sphyrna zygæna** (Linnaeus).

Formosa (Jordan & Evermann).

Family ALOPIIDÆ.

9. **Alopias vulpes** (Gmelin).

Two specimens from Takao, ten and one-half inches to base of lower caudal lobe; twelve inches to tip of tail.

Family SQUALIDÆ.

10. **Squalus japonicus** Ishikawa, (?).

A fetus from Formosa (Jordan & Evermann).

Family RHINOBATIDÆ.

11. **Rhinobatus schlegeli** Müller & Henle.
Formosa (Jordan & Evermann).

Family RAJIDÆ.

12. **Raja hollandi** sp. nov. (Plate LXIV.)

Interorbital space $3\frac{2}{3}$ in distance from eye to tip of snout; width of mouth $1\frac{3}{5}$; length of first dorsal $1\frac{1}{3}$ times, caudal (upper lobe) $1\frac{1}{2}$ times interorbital space; length of eye nearly equal to interorbital space.

Body rhomboid, broad, the width of the disk one-fourth greater than its length; head not large and snout not much produced, though ending in a small point; anterior margin of disk full (slightly convex) in front of and lateral to eyes, weakly concave in outer half; distance between eye and margin of disk twice interorbital space; mouth scarcely undulate, the angle made by meeting lower jaws about 75° - 80° ; teeth small, rounded, about forty-five rows in upper jaw: nostrils large, separated a distance about equal to width of mouth, their length (antero-posterior) about one-half width of mouth, with which nostrils are confluent; posterior margin of nasal flaps fringed; interorbital space concave; a supraorbital semi-circle of eight or ten short spines, directed backward; spiracles a little wider than half length of eye, directly posterior to eye's outer half; width of gill-opening about $2\frac{1}{2}$ in length of eye; body and head smooth except for the supraorbital spines and a single median dorsal spine a little farther behind eyes than their distance apart; back and sides of tail with five rows of short backwardly directed spines; under edges of snout, to a point even with outermost gill-opening, beset with numerous minute spines.

Dorsals separated a distance $1\frac{1}{3}$ times length of base of first dorsal; second dorsal separated from caudal a distance three-fifths length of base of first dorsal; total length of tail from axilla of ventrals equal to seven-tenths width of disk; angle of pectorals falling a little in front of midway of length of disk; ventrals deeply notched, distance from ventral notch to posterior tip of ventral about four times in length of tail.

Color in spirits brown above, lighter bluish to greenish beneath; back and all upper surface except tail and snout densely covered with small black specks about the size of coffee grains; snout translucent, its upper surface appearing whitish in reflected light; the numerous mucus pores of under side of snout and sides of mouth each surrounded by a circle of black; tail brownish above (perhaps faintly mottled), paler with some dusky underneath.

Described from a single specimen, female, from Takao; length of disk eight and one-fourth inches, width ten inches, tail seven inches. It is named for Dr. William J. Holland, Director of the Carnegie Museum.

Family DASYATIDÆ.

13. **Dasyatis bennetti** (Müller & Henle) (?). (Plate LXV.)

(*Trygon carnea* Richardson, Ichth. Chin., 197, fœtus.)

One specimen from Takao with disk fourteen inches long and thirteen inches wide, and tail thirty-one inches long, we refer provisionally to this species, which was described from Hong Kong. Front margins of pectorals converging at an angle of 65° ; sides of the short tip of snout meeting at nearly a right angle; tail with a low black cutaneous fold on under side, originating under the serrated spine and extending backward a distance three times interorbital space; a very short fold on top of tail extending back of reflexed spine a distance equal to interorbital space; top of tail for remainder of its length roughened by minute spine-like tubercles; a median dorsal row of short but strong spines originating behind gill-cavity and reaching to base of serrated tail-spine; many small tubercles on either side of this row anteriorly; width of mouth contained two and one-half times in space between anterior gill-openings; margin of nasal flap with a short fringe; color uniform blackish above, pale below; tail without bands. The tail is shorter than in *Dasyatis bennetti* and the armature somewhat different. It is questionable whether this identification is correct and the species may be undescribed.



FIG. 2. *Dasyatis akajei* (Schlegel). (After Jordan and Evermann, Proc. U. S. N. M., Vol. 25, p. 319.)

14. **Dasyatis akajei** (Schlegel).

Formosa (Jordan & Evermann).

Family ELOPIDÆ.

15. **Elops hawaiiensis** Regan. (Plate LXVI, upper figure.)

Depth 6.8; head 4.2; snout a little longer than eye, the transverse diameter of which is 3 in maxillary; interorbital width (measured on skull) a little over 5 in head; maxillary extending beyond eye, more than one-half length of head; lower jaw shutting inside upper (tip slightly projecting), so that the whole of the premaxillary band of teeth is exposed when the mouth is closed; length of gular plate two-thirds that of lower jaw; twenty-seven branchiostegals; thirteen gillrakers on lower limb of anterior arch; ninety-seven scales in a longitudinal series from gill-opening to the base of the caudal; dorsal twenty-three, with nineteen branched rays; anal fifteen, with twelve branched rays; pectoral one-half width of pupil, more than one-half length of head, extending three-sevenths of the distance from its insertion to the front of the ventrals; origin of the ventrals slightly nearer the base of the caudal than the end of the snout; caudal peduncle scarcely compressed anteriorly, its width over the tip of the anal scarcely less than its depth; least depth of caudal peduncle $3\frac{1}{2}$ in head, least width 6.

One specimen thirty-six inches and one twelve inches long were received from Takao. The larger specimen seems to agree well with one thirty-four inches long recorded by Evermann and Seale (1906) from the Philippines, measurements of which have been furnished by Dr. Evermann. Specimens in the museum of Stanford University from Honolulu and Manila seem also to belong to this species, though none of these is over fourteen inches in length. In specimens of that size and under the body is notably less slender and the caudal peduncle much more compressed than in the adult specimen here recorded from Formosa.

This species is recorded by Jordan & Evermann from Suwata, Formosa, as *Elops machnata*, which is the species of the Red Sea.

Family MEGALOPIDÆ.

15. **Megalops cyprinoides** (Broussonet).

Giran, Formosa (Jordan & Evermann).

Family CHIROCENTRIDÆ.

16. **Chirocentrus dorab** (Forskål).(Native name *Sai do*).

One specimen twenty-two inches and two sixteen inches long from Takao.

Family CHANIDÆ.

17. **Chanos chanos** (Forskål).

Giran, Taihoku, and Toii (Jordan & Evermann).

Family CLUPEIDÆ.

18. **Sardinella toli** (Cuvier & Valenciennes).

Five specimens three to four inches long from Takao. Kotosho (Jordan & Evermann). The genus *Sardinella* is identical with *Harengula* and probably also with *Kowala*. The Sardines and Pilchards should stand as *Amblygaster* Bleeker, a name earlier than that of *Sardinia* Poey.

19. **Amblygaster maculatum** (Richardson).

Giran (Jordan & Evermann).

20. **Amblygaster immaculatum** (Kishinouye).

Seven specimens, four and one-half inches long from Takao, Formosa.

Dorsal 16 or 17; anal 16; scales 44; head 3.6 in length without caudal, a pupil's width more than greatest depth of body; depth 4.3 in length; body compressed, greatest width nearly 2 in depth; eye 3 in head, equal to snout without adipose eyelid; lower jaw slightly projecting when mouth is closed; maxillary 2 in head, not quite reaching middle of eye; small teeth in front of lower jaw; vomer, tongue and palatines smooth; origin of dorsal nearer snout than base of caudal; ventrals inserted in front of middle of dorsal; gill-rakers fine, length two-thirds of eye; scales deciduous, posterior edges smooth or broadly sinuate, some with evident striæ.

Color silvery below, bluish black above; upper and lower jaw tipped with blackish; a narrow median frontal line of blackish from above pupil to even with nostrils.

This is probably identical with *Clupea immaculata* described by Kishinouye from the Riu Kiu Islands.

21. **Ilisha elongata** Bennett.

Formosa (Jordan & Evermann).

22. **Dussumieria elopoides** (Bleeker).

Kotosho (Jordan & Evermann).

Family ENGRAULIDÆ.

23. **Anchovia hamiltoni** (Gray).

(Native name *Poe koe.*)

Four specimens three to four inches long from Takao.

24. **Anchovia indica** (Van Hasselt).(Native name *Gang a hii*; *Jau a.*)

Three specimens four inches long from Takao.

25. **Anchovia koreana** (Kishinouye).(Native name *Un na.*)

One specimen four inches long from Takao. Dorsal 12; anal 30; lower jaw very short.

Family DOROSOMIDÆ.

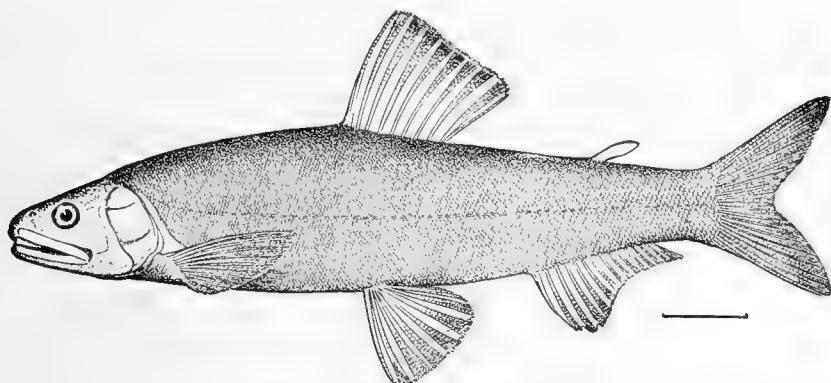
26. **Konosirus thrissa** (Osbeck) = *Dorosoma nasus* (Bloch).(Native name *Beng pian.*)

Four specimens seven and one-half inches long from Takao.

Family SALMONIDÆ.

27. **Plecoglossus altivelis** Temminck & Schlegel.

Taihoku (Jordan & Evermann).

FIG. 3. *Plecoglossus altivelis* Tem. & Schl. (After Jordan & Evermann, Proc. U. S. N. M., Vol. 25, p. 328.)

Family SALANGIDÆ.

28. **Parasalanx acuticeps** (Regan).

Lake Candidius, Formosa (Regan).

Family SYNODONTIDÆ.

29. **Trachinocephalus myops** (Forster).(Native name *Gau bu.*)Seven specimens five to six and one-half inches long from Takao. We have not yet separated the Japanese *Trachinocephalus trachinus* from *T. myops* of the Atlantic.

30. **Saurida gracilis** (Quoy & Gaimard).(Native name *Soa tngah.*)

Six specimens three to eight inches long from Takao.

31. **Saurida argyrophanes** (Richardson).(Native name *Gau bu.*)Three specimens twelve inches long from Takao. Adipose eyelid thick and broad, as much so as in the figure of *Saurida eso* of Jordan & Herre.32. **Saurida tumbil** (Cuvier) ?

A single specimen from Takao, six and one-half inches long, is referred with doubt to this species. Scales 61; cross bands not evident on back; adipose eyelid narrow.

Family PLOTOSIDÆ.

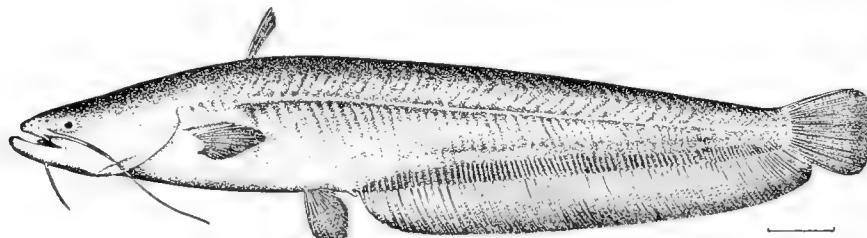
33. **Plotosus anguillaris** (Bloch).

Five specimens from Takao, six to eight inches long. Giran (Jordan & Evermann).

Family SILURIDÆ.

34. **Parasilurus asotus** (Linnæus).

Taihoku (Jordan & Evermann).

FIG. 4. *Parasilurus asotus* (Linnæus). (After Jordan & Evermann, Proc. U. S. N. M., Vol. 25, p. 320.)35. **Tachysurus sinensis** Lacépède.

Suwata (Jordan & Evermann).

36. **Tachysurus falcarius** Richardson.

Suwata (Jordan & Evermann).

37. **Liobagrus formosanus** Regan.

Lake Candidius (Regan).

Family CLARIIDÆ.

38. **Clarias fuscus** (Lacépède).(Native name *tan* or *taro sat*).

One specimen from Takao, seven inches long.

Taihoku (Jordan & Evermann).

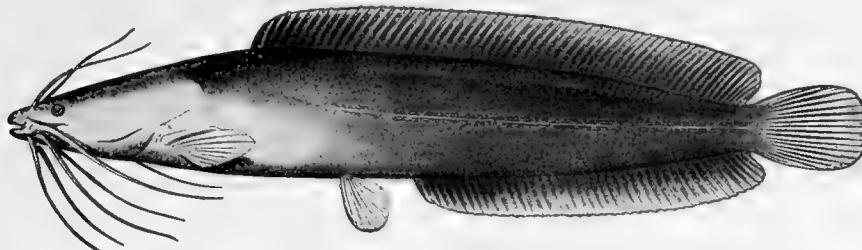


FIG. 5. *Clarias fuscus* (Lacépède). (After Jordan & Evermann, Proc. U. S. N. M., Vol. 25, p. 321.)

Family COBITIDÆ.

39. **Misgurnus decemcirrosus** (Basilewsky).

Three specimens from Formosa, Tan Sin River at Taihoku (Jordan & Evermann). Scales 121; depth 6.7 in length; longest barbel 2 in head. This is a fish with a deeper, less pointed head, and paler color than *M. anguillicaudatus*.

Family CYPRINIDÆ.

40. **Carassius auratus** (Linnaeus).

Four specimens from Takao.

41. **Cyprinus carpio** Linnaeus.

Formosa (Jordan & Evermann).

42. **Gymnostomus labiatus** Regan.

Lake Candidius (Regan).

43. **Rohita decora** (Peters).

Formosa (Jordan & Evermann).

44. **Candidia** (gen. nov.) **barbata** (Regan) = *Opsariichthys barbatus* Regan.

From Lake Candidius (Regan).

This species, differing from *Opsariichthys*, by the presence of barbels, must be regarded as the type of a distinct genus, *Candidia*.

45. **Ctenopharyngodon idellus** (Cuvier & Valenciennes).

Taihoku (Jordan & Evermann).

46. **Hemibarbus barbus** (Temminck & Schlegel, Günther).

Formosa (Jordan & Evermann).

47. **Culter brevicauda** Günther.

Formosa (Günther, Jordan & Evermann).

48. **Cirrhina** sp.

Formosa (Jordan & Evermann).

49. **Pararasbora maltrechti** Regan.
Lake Candidius, Formosa (Regan).

50. **Zacco pachycephalus** (Günther).
Suwata, Taihoku (Jordan & Evermann).

51. **Zacco evolans** Jordan & Evermann.
Tan Sin River, Taihoku (Jordan & Evermann).

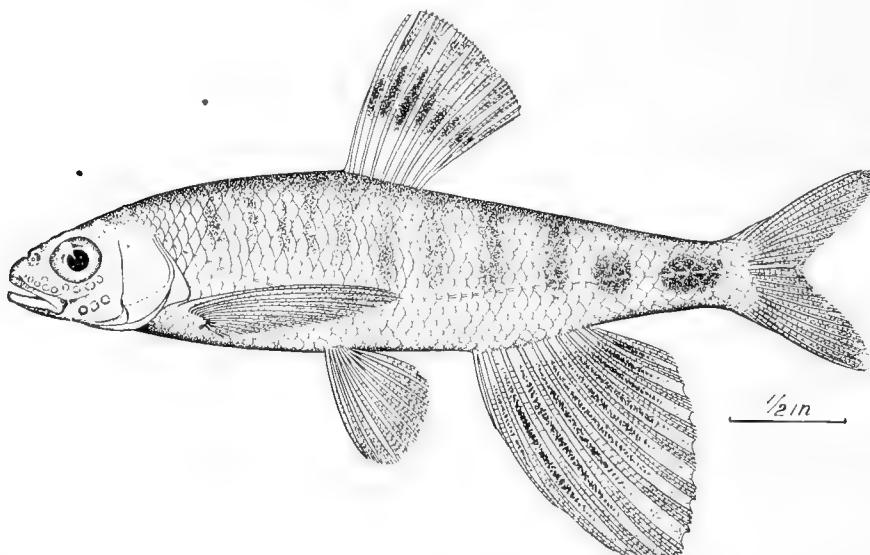


FIG. 6. *Zacco evolans* J. & E. (After Jordan & Evermann, Proc. U. S. N. M., Vol. 25, p. 323.)

52. **Acheilognathus mesembrinum** Jordan & Evermann.
Kotosho (Jordan & Evermann).

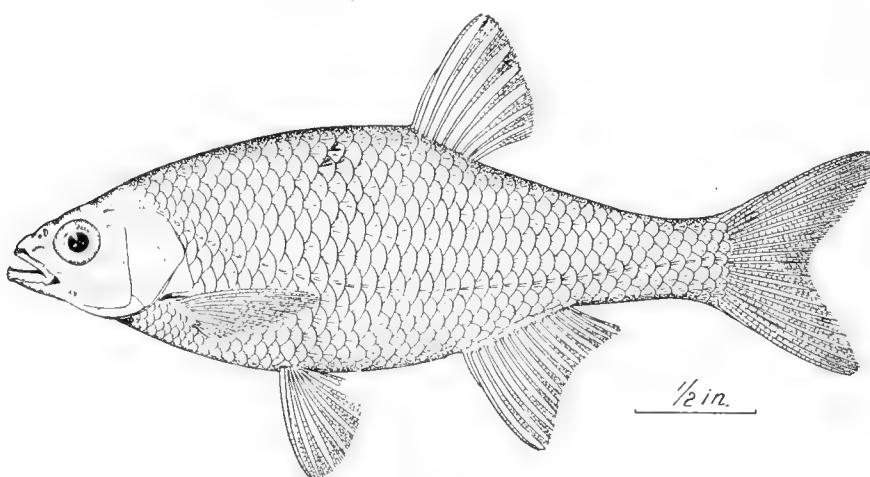


FIG. 7. *Acheilognathus mesembrinum* J. & E. (After Jordan & Evermann, Proc. U. S. N. M., Vol. 25, p. 324.)

53. **Dillonia** sp.
Formosa (Jordan & Evermann).

Family MONOPTERIDÆ.

54. **Monopterus albus** Zuiuew.
Hokoto (Jordan & Evermann).

Family ANGUILLIDÆ.

55. **Anguilla sinensis** McClelland.

Seven specimens, thirteen to sixteen inches long, from Takao. Taihoku (Jordan & Evermann).

56. **Anguilla manilensis** (Bleeker).
Kotosho, Jordan & Evermann.

57. **Anguilla mauritiana** Bennett.
Kotosho, Jordan & Evermann.

58. **Anguilla remifera** Jordan & Evermann.
Hokoto (Jordan & Evermann).

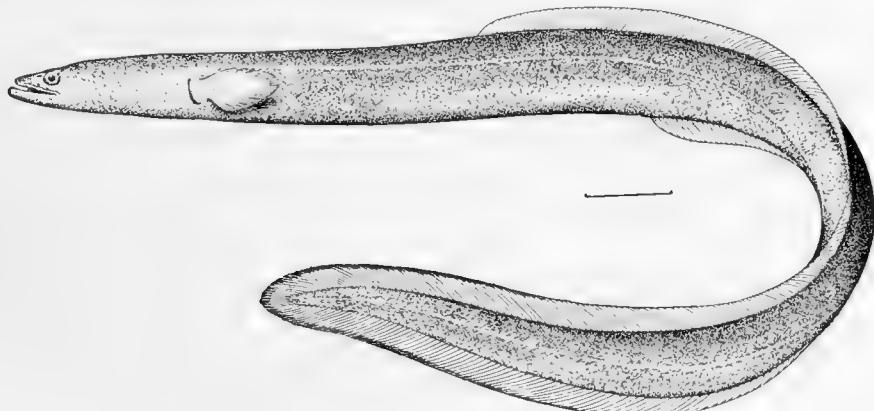


FIG. 8. *Anguilla remifera* J. & E. (After Jordan & Evermann, Proc. U. S. N. M., Vol. 25, p. 325.)

Family LEPTOCEPHALIDÆ.

59. **Leptocephalus anagoides** (Bleeker).
(Native name *Tsoan*.)

Eleven specimens from Takao six to eleven inches long. This species seems to differ clearly, though slightly, from *Leptocephalus (Congrellus) anago* (Schlegel) in the more anterior insertion of the dorsal (in front of base of pectoral), darker color about head, especially on under side, broader black margin on dorsal and anal, and reduction in size, or absence, of the white tip of the tail.

60. **Leptocephalus ectenurus** sp. nov. (Plate LXVI, lower figure.)
Head 1.25 to 1.3 in trunk; head and trunk 1.9 to 2.12 in total length; tail

tapering rapidly, becoming very slender toward tip, much as in *Uroconger lepturus*; head notably large, occipital region elevated; snout long, 1.5 times eye, 3.75 in head, projecting beyond lower jaw a distance equal to two-thirds of eye; eye 5.3 in head; anterior and posterior nostrils with low raised flaps; cleft of mouth reaching to middle of eye; teeth in jaws all pointed, closely set in broad bands in both jaws; vomerine patch subtriangular, rounded anteriorly; a few scattered, pointed teeth slightly longer than the rest in the front portion; the posterior (vomerine) teeth short and blunt; circular part of patch of teeth on vomer exposed when mouth is closed; tongue free; pectoral 3.3 in head; dorsal beginning over gill-opening, distinctly in front (one-half width of pupil) of pectoral; thirty-one pores before vent.

Color in spirits light olive brown, paler below; top and sides of head more heavily punctulated with dusky; dorsal and anal black edged, the whole of both fins tending to blackish on last third or half of tail; pectorals plain; tip of tail black.

Described from two excellent specimens eighteen and nineteen inches long from Takao.

This species seems to bridge the rather slight distinction heretofore made between *Leptocephalus* and *Congrellus*, having the long tail of the former and the anteriorly inserted dorsal of the latter.

We may note that *Myrophis (Gnathophis) heterognathus* (Bleeker) seems to be a young specimen of *Leptocephalus nystromi* Jordan and Fowler, both species being described from Nagasaki. The species should stand as *Leptocephalus heterognathus*.

Family OPHICHTHYIDÆ.

61. *Ophichthus evermanni* sp. nov. (Plate LXVII, upper figure.)

Two specimens from Takao, seventeen and twenty-one inches long, seem to agree fairly well with the "variety" *Ophichthus cephalozona* recorded by Dr. Günther from Japan (Catalog of Fishes in the British Museum, Vol. VIII, p. 70), having the body very distinctly marked with numerous blotches resembling cross-bands. The nuchal band is scarcely less distinct than in the figure by Dr. Bleeker. The dorsal of one specimen shows no distinct white edge, while in the other (nineteen inches long) the white margin shows plainly. In both specimens the dorsal partakes more or less of the mottled coloration of the body. The pectoral is $3\frac{1}{2}$ or 4 in head; the dorsal begins in front of the posterior fourth of the reflexed pectoral.

This species is recorded as *Ophichthus cephalozona* from Hokoto, by Jordan & Evermann.

62. *Pisoödonophis boro* (Hamilton Buchanan).

Toii (Jordan & Evermann).

Family MURÆNIDÆ.

63. **Echidna polyzona** (Richardson).

One specimen eighteen and one-half inches long from Takao.

64. **Gymnothorax reticularis** Bloch.

Five specimens ten to fourteen inches long from Takao.

65. **Gymnothorax pescadoris** Jordan & Evermann.

Pescadores Islands (Hokoto) (Jordan & Evermann).



FIG. 9. *Gymnothorax pescadoris* J & E. (After Jordan & Evermann, Proc. U. S. N. M., Vol. 25, p. 326.)

66. **Gymnothorax fimbriatus** (Bennett).

(*Muraenophis stellatus* Lacépède?; *Gymnothorax isingleenoides* Bleeker.)

One specimen from Takao, twelve and one-half inches long, agreeing in all respects with Bleeker's description and figure (of young) of *G. isingleenoides*. The specimen agrees very well also with examples from Samoa, recorded by Jordan & Seale as *G. stellatus* (Lacépède) and with a single young specimen from Sumatra received from Mr. H. W. Fowler. It may be that the name *stellatus* should stand in place of *fimbriatus*. *Muraena bullata* Richardson, figured by Bleeker, seems to be distinct.

67. **Gymnothorax flavomarginatus** (Rüppell).

One specimen from Takao twenty-two inches long.

68. **Gymnothorax pseudothyrsoides** (Bleeker). (Perhaps not of Day.)

A large specimen two feet in length from Takao, appears to agree in all essential respects with Bleeker's figure and description. The dorsal begins half way between the gill-opening and the back of the orbit; the ground color is rather dark brown, finely reticulated, or marbled everywhere with lighter, and is scarcely paler on the chin and the belly than on the upper parts; there is no black about the gill-opening, and no light border to the fins except at the tip of the tail. The species is near

Gymnothorax philippinus Jordan & Seale, but seems to have a heavier body, less pointed tail, and darker chin and belly. The markings on the sides of the tail are obscured in the specimen.

69. **Gymnothorax melanospilos** (Bleeker). (Plate LXVII, lower figure.)

Head 6.9 in total length, 2.5 in trunk; head and trunk equal in length to tail; depth 2 in head; snout 5.75 in head, much compressed, its width in front of eyes hardly more than one-third width of head; eye small, 12 in head, 2 in snout.

Body rather slender, the tail tapering but the tip rounded rather than pointed; mouth large, the eye midway between its angle and tip of snout; teeth in single series; two depressible canines in upper jaw; gill-opening a little longer than eye; dorsal inserted half way between gill-opening and eye, its height apparently a little less than half the depth of the body; anal low.

Ground color in spirits light purplish brown, considerably paler on chin and fore part of belly; body and fins everywhere covered with roundish or elongate (when double) black spots, as a rule a little larger than eye, and when confluent or double oftenest arranged longitudinally; there are evident on the tail three more or less distinct longitudinal rows of the larger spots, and a row of smaller ones along the base of the anal; the spots on the trunk and head are not in distinct rows, though about four or five rows might be surmised as the basis of the pattern; the spots on chin, cheeks, and snout are distinct, but smaller and more irregular in form than those on the hinder part of the head and on the tail and body; on the neck underneath the gill-opening are about five narrow blackish longitudinal streaks, coinciding with cuticular creases; the dorsal has a basal and a marginal row of spots like those of the body, while the anal has one row of such spots; the edge of both dorsal and anal is pale between the black spots, but there is not a continuous pale edge, except at tip. (Dr. Günther, who had Bleeker's type, says *G. melanospilos* has fins with a narrow whitish edge.)

This species seems scarcely different from *Gymnothorax pescadoris* Jordan & Evermann, except in coloration (spots on head and tail larger). The width of the snout is not stated in the original description of that species. The very much compressed snout of our specimen (agreeing with Günther's statement about *G. melanospilos*) is very striking.

70. **Gymnothorax leucostigma** sp. nov. (Plate LXVIII.)

Head 6.6 in length, 2.05 in trunk, 3.6 in tail; tail about $\frac{1}{2}$ head's length longer than head and trunk; depth 1.7 in head; snout 5.5; eye 11.5.

Body rather heavy and short, tail pointed; occipital region elevated, the de-

scent steep to eye; snout compressed laterally to scarcely more than the width of the interorbital space, which is 3 in width of head; mouth large, the eye being midway between its angle and tip of snout; teeth in single series in jaws; no depressible canines or other teeth on vomer; gill-opening about diameter of eye; dorsal inserted in front of gill-opening one-third distance from it to front of eye; height of dorsal more than one-third depth of body; height of anal about equal to eye.

Ground color reddish brown; head, body, tail, and fins covered with large roundish pale spots, usually larger but sometimes smaller than eye; the spots are plainer and in three to four fairly definite rows on tail, and there are four to five indefinite rows on body; the spots on sides and top of head are numerous, but much smaller than the large ones on body; chin, breast, and belly apparently without spots and not much paler than the upper ground color; some blackish about gill-opening, in the thoracic creases, and at angle of mouth; dorsal with two rows of pale spots, anal with one row; margin of dorsal blackish between pale spots.

One specimen 31 inches long from Takao.

71. *Evenchelys macrurus* (Bleeker).

One specimen forty-three inches long from Takao; Kotosho (Jordan & Evermann).

Family BELONIDÆ.

72. *Tylosurus caudimaculatus* (Cuvier).

One specimen twelve inches long from Takao.

73. *Tylosurus coromandelicus* (Van Hasselt).

(Native name *O lan.*)

Two specimens, one twenty inches, and the other sixteen inches long, from Takao.

74. *Tylosurus schismatorhynchus* (Bleeker).

(Native name *O lan.*)

One specimen twenty inches long from Takao.

75. *Tylosurus leiurus* (Bleeker).

Formosa (Jordan & Evermann).

76. *Tylosurus melanostigma* (Cuvier & Valenciennes).

Formosa (Jordan & Evermann).

Family HEMIRAMPHIDÆ.

77. *Hemiramphus far* (Forskål).

Two specimens, respectively ten and twelve inches long, from Takao. Formosa (Jordan & Evermann).

78. **Hemiramphus melanurus** Cuvier & Valenciennes.
Fifteen specimens three to five inches long from Takao.

79. **Hemiramphus georgii** Cuvier & Valenciennes.
Formosa (Jordan & Evermann).

80. **Euleptorhamphus longirostris** (Cuvier).
Formosa (Jordan & Evermann).

Family EXOCETIDÆ.

81. **Cypsilurus spilonotopterus** (Bleeker).
Formosa (Jordan & Evermann).

Family FISTULARIIDÆ.

82. **Fistularia petimba** (Lacépède).
Four specimens five to fifteen inches long from Takao. Formosa (Jordan & Evermann).

Family MUGILIDÆ.

83. **Mugil œur** Forskål.
Keerun ; Taihoku (Jordan & Evermann).

84. **Liza troscheli** (Bleeker).
One specimen six inches long from Takao. Hokoto (Jordan & Evermann).

Family SPHYRÆNIDÆ.

85. **Sphyraena jello** Cuvier & Valenciennes.
(Native name *Soh ah.*)
Two specimens ten inches long from Takao. Formosa (Jordan & Evermann).

86. **Sphyraena langsar** Bleeker.
Two specimens twelve inches long from Takao.

87. **Sphyraena japonica** Temminck & Schlegel.
Formosa (Jordan & Evermann).

88. **Sphyraena forsteri** (Cuvier & Valenciennes).
Formosa (Jordan & Evermann).

Family AATHERINIDÆ.

89. **Atherina bleekeri** Günther.
Four specimens three inches long from Takao.

Family POLYNEMIIDÆ.

90. **Polydactylus plebeius** (Broussonet).
Four specimens three to ten inches long from Takao. Scales 63 to 65 ; pectoral filaments 5.

91. **Polydactylus zophomus** Jordan & McGregor.
Kotosho (Jordan & Evermann) (as *P. plebeius*).
 92. **Eleutheronema tetradactylum** (Shaw). (*Polydactylus rhadinus* Jordan & Evermann.)

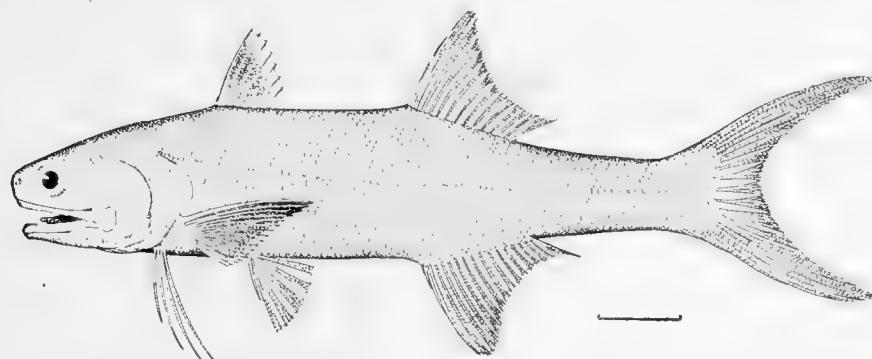


FIG. 10. *Eleutheronema tetradactylum* (Shaw). (After Jordan & Evermann, Proc. U. S. N. M., Vol. 25, p. 351.)

Two specimens, respectively ten and twelve inches long, from Takao. Described from Formosa by Jordan & Evermann as *Polydactylus rhadinus*. Our specimens agree fairly well with the published figure of Jordan & Evermann.

The genus *Eleutheronema* Bleeker may perhaps be retained as defined by the absence of the air-bladder. This is present in *Polydactylus*.

Family HOLOCENTRIDÆ.

93. **Ostichthys japonicus** (Cuvier & Valenciennes).
Formosa (Jordan & Evermann).

Family SCOMBRIDÆ.

94. **Scomber japonicus** Houttuyn.
Formosa (Jordan & Evermann).
 95. **Rastrelliger kanagurta** (Russell).
Formosa (Jordan & Evermann).
 96. **Euthynnus alleteratus** (Rafinesque).

Three specimens ten inches long from Takao. Formosa (Jordan & Evermann). The genus *Euthynnus* Lütken should apparently be separated from *Gymnosarda* (*nuda*). The latter has the corselet scaleless, covered by wrinkled skin (Rüppell).
 97. **Scomberomorus commersoni** (Lacépède).

(Native name *To to*.)

One specimen twenty-one inches long from Takao.

98. **Scomberomorus guttatus** (Bloch & Schneider).
(Native name *Be ka*.)

One specimen twenty inches long from Takao.

99. **Scomberomorus kuhlii** (Cuvier & Valenciennes).

Formosa (Jordan & Evermann).

Family CARANGIDÆ.

100. **Scomberoides sancti-petri** (Cuvier & Valenciennes).

(Native name *Shi chang ah.*)

Three specimens from Takao, four to eight inches long.

101. **Scomberoides tol** (Cuvier & Valenciennes).

Five specimens from Takao, ten inches long. Giran (Jordan & Evermann, as *S. orientalis*).

102. **Megalaspis cordyla** (Linnaeus).

(Native name *Thi gha.*)

Two specimens from Takao, fourteen inches long. Formosa (Jordan & Evermann).

103. **Decapterus muroadsi** (Temminck & Schlegel).

Formosa (Jordan & Evermann).

104. **Decapterus macrosomus** (Bleeker).

Formosa (Jordan & Evermann).

105. **Trachurops crumenophthalmus** (Bloch).

(Native name *Ba lang.*)

One specimen from Takao, nine inches long. Formosa ; Giran (Jordan & Evermann, as *T. forra*).

106. **Caranx leptolepis** Cuvier & Valenciennes.

Keerun (Jordan & Evermann).

107. **Caranx malabaricus** (Schneider).

Keerun (Jordan Evermann).

108. **Caranx jarra** Cuvier & Valenciennes.

Keerun (Jordan & Evermann).

109. **Caranx affinis** Rüppell.

One specimen from Takao, eleven inches long.

110. **Caranx djeddaba** (Forskål).

One specimen from Takao, eleven and one-half inches long.

111. **Caranx sexfasciatus** (Quoy & Gaimard).

(Native name *Ambo Koyo* = "red eye.")

Two specimens from Takao, one eight and one-half inches, and another fourteen inches long.

112. **Caranx forsteri** Cuvier & Valenciennes.
Keerun (Jordan & Evermann, as *C. sexfasciatus*).
113. **Caranx ignobilis** (Forskål).
(Native name *Go yan.*)
One specimen from Takao, six inches long.
114. **Caranx speciosus** (Forskål).
One specimen from Takao, twelve inches long.
115. **Caranx plumbeus** (Quoy & Gaimard).
(Native name *Go yen.*)
Three specimens from Takao, eight to ten inches long.
116. **Caranx rastrosus** Jordan & Snyder. (Plate LI.)
(*Caranx plumbeus* Jordan & Seale, Cavite, P. I.)
(Native name *Go yen.*)
One example, thirteen and one-half inches long, the type, from Takao.
117. **Caranx formosanus** Jordan & Snyder. (Plate LII.)
(Native name *Go yan.*)
One specimen, the type, eleven and one-half inches in length, from Takao.
Formosa (Jordan & Evermann, as *C. armatus*).
118. **Ulua richardsoni** Jordan & Snyder. (Plate LIII.)
One large specimen eighteen inches long, type of the species, and one cotype,
eight inches long, from Takao.
119. **Apolectus niger** (Bloch).
One specimen from Takao.

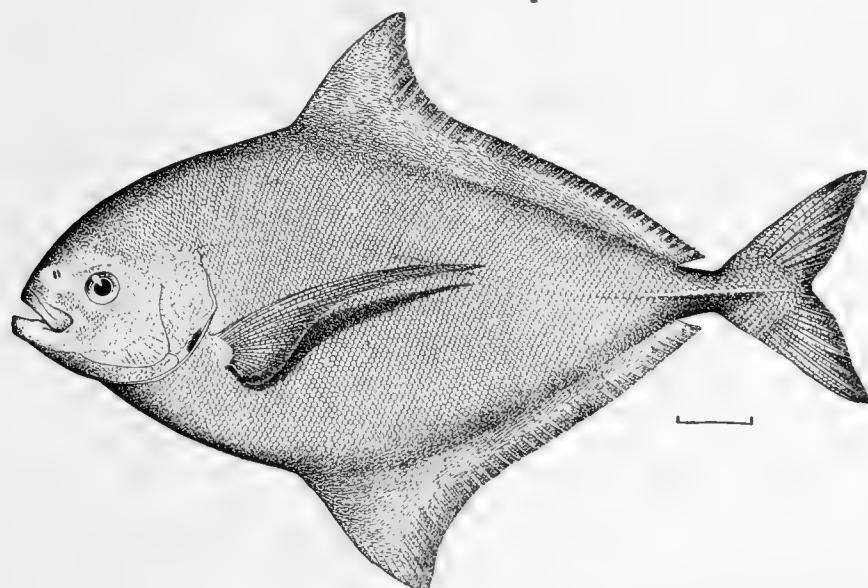


FIG. 11. *Apolectus niger* (Bloch). (After Jordan & Evermann, Proc. U. S. N. M., Vol. 25, p. 339.)

120. **Trachinotus bailloni** (Lacépède).

Three examples from Takao, three to thirteen inches long.

121. **Trachinotus russelli** Cuvier & Valenciennes.

One specimen from Takao, fifteen inches long.

122. **Trachinotus ovatus** (Linnaeus).

One large specimen, twenty-seven inches long, from Takao.

123. **Alectis major** (Cuvier & Valenciennes).

Two fine specimens, seven and ten inches long, from Takao. This is identical with *Zeus gallus* Bloch, not of Linnaeus, and with *Scyris indica* Rüppell. It seems to be distinct from *Alectis ciliaris*.

Formosa (Jordan & Evermann, as *A. ciliaris*).

Family MENIDÆ.

124. **Mene maculata** (Bloch).

Five specimens from Takao, four inches long.

Family RACHYCENTRIDÆ.

125. **Rachycentron canadum** (Linnaeus).

Three specimens, sixteen to twenty-four inches long, from Takao.

Family TRICHIURIDÆ.

126. **Trichiurus haumela** (Forskål).

Three specimens from Takao, Formosa, eighteen inches to three feet long. Scales 134 or 135; eye in snout 2.5 in smaller, 2.7 in larger specimen; whip of tail less slender and elongate than in specimens of *T. japonicus* from China.

127. **Trichiurus japonicus** Temminck & Schlegel.

Hokoto (Jordan & Evermann).

Family LEIOGNATHIDÆ.

128. **Leigonathus caballus** (Cuvier & Valenciennes).

(Native name *Go yan*.)

Five specimens from Takao, five to nine inches long.

129. **Leiognathus splendens** (Cuvier).

Three specimens from Takao, one to two inches long.

Formosa (Jordan & Evermann).

130. **Leiognathus rivulatum** (Temminck & Schlegel).

Twelve specimens from Takao, two to three inches long.

131. **Leiognathus edentulum** (Bloch).

Formosa (Jordan & Evermann). (Probably the same as *L. caballus*.)

132. **Gazza æquulæformis** (Rüppell).

Kotosho (Jordan & Evermann).

133. **Equula ruconia** (Hamilton-Buchanan).

Three young specimens from Takao, one to one and one-half inches long. Somewhat slimmer than *E. ruconia* of larger size from the Philippines.

Family STROMATEIDÆ.

134. **Psenopsis anomala** (Temminck & Schlegel).

One specimen three inches long from Takao.

Family PEMPHERIDÆ.

135. **Pempheris nyctereutes** Jordan & Evermann.

Hokoto (Jordan & Evermann).

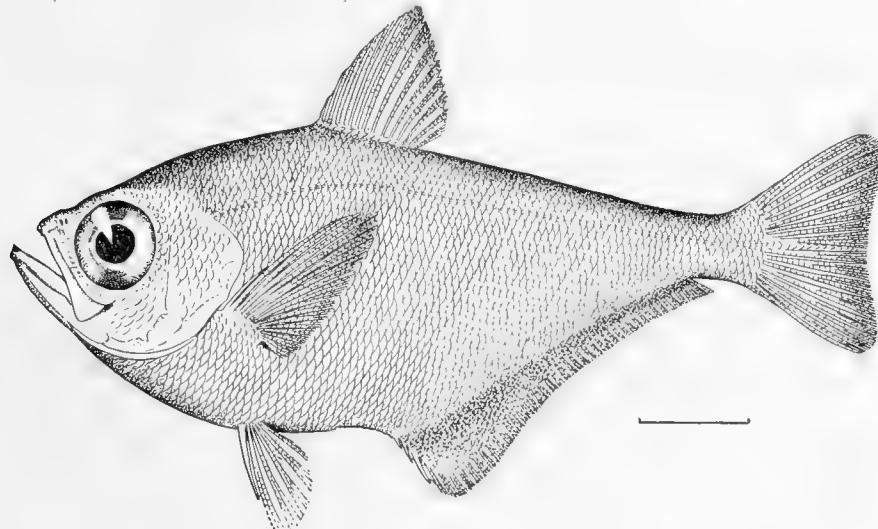


FIG. 12. *Pempheris nyctereutes* J. & E. (After Jordan & Evermann, Proc. U. S. N. M., Vol. 25, p. 340.)

Family APOGONICHTHYIDÆ.

136. **Amia quadrifasciata** (Cuvier & Valenciennes).

Four specimens, two and one half inches long, from Takao. *Amia elizabethae* Jordan & Seale (Proceedings Davenport Academy of Sciences, Vol. X, p. 9, Pl. IV, 1905) is very close to this species, but the lower stripe is fainter and the body deeper.

137. **Apogonichthys fo** (Jordan & Seale).

Two specimens, two inches long, from Takao.

138. **Archamia macropteroides** (Bleeker).

Six specimens, two to two and three quarters of an inch long, from Takao.

139. **Archamia notata** (Day).¹ (Plate LXIX.)

¹ Not *Apogon notatus* Jordan & Snyder = *Sparus notatus* Houttuyn which is a valid *Amia*.

Head 2.5 in length; depth 2.75 to 2.9; eye 3 in head, 8.5 to 9 in length to base caudal; snout 4.7 to 4.9 in head; interorbital 4.2; dorsal VI-I, 9; anal II, 16 or 17; scales 3-25-5.

Body noticeably more elongate and thinner than in *Archamia macropterus*² (Bleeker); depth of caudal peduncle 2.3 in head; profile straight to a point over front of eye, the tip of the snout a very little upturned; mouth large, upturned; maxillary 2.2 in head; maxillary extending to nearly under middle of eye; upper lip on level with middle of eye; tip of lower jaw slightly projecting when mouth is closed; minute villiform teeth in jaws and on vomer and palatines; no canines; 16 gill-rakers on lower limb of outer arch, longer than the corresponding filaments, the longest about 2 in eye; preopercle finely denticulated about angle on both hinder and lower margin; operculum with a thin flat point, even with middle of eye, and a little above it a second less prominent point; scales ctenoid; lateral line apparently complete (some scales missing in all specimens); cheeks scaled; origin of spinous dorsal half-way between axil of soft dorsal and front of eye; longest dorsal spine 2.7 in head, first dorsal spine $\frac{2}{3}$ second; origin of anal a little in front of that of soft dorsal; ventrals 1.8 in head, their origin slightly in front of base of pectorals; pectorals 1.4; caudal weakly emarginate.

Color in spirits light straw, rather sparsely and faintly punctulated above on head and body; lower parts of sides and belly nearly plain; a small but very distinct blotch at base of caudal, its diameter less than one-half that of pupil; tip of lower jaw dusky; dorsals, caudal, and anal tinged with dusky; no fin with dark tip or edge; no spot on shoulder.

Described from six specimens from Takao, two to two and one-half inches long.

This species seems to be well distinguished from *Archamia macropterooides* by its slenderer form, smaller eye, different coloration, fewer punctulations tending to form no pattern, and the prominent but very small caudal spot. The first dorsal spine is little shorter than the second, which is also the case in *Archamia bleekeri* Günther (= *Apogon macropterus* Bleeker, not Kuhl & Van Hasselt). In *Archamia macropterooides* the first spine is scarcely more than half the length of the second. In *Archamia bleekeri* there is a distinct black blotch on the shoulder, as well as at base of caudal. In *Archamia macropterooides* the caudal spot is much less distinct, and the shoulder spot indistinct or absent. *Archamia fucata* (Cantor) has a smaller mouth and most of the other nominal species have fewer rays in the anal fin.

²The specimen from Samoa called *Archamia lineolata* by Jordan & Seale should probably stand as *Archamia macropterooides*. *Archamia lineolata* from the Red Sea with fourteen soft rays in the anal and with twelve dark cross streaks must be different and also distinct from the present species.

Family KUHLIIDÆ.

140. **Kuhlia marginata** (Cuvier & Valenciennes).
Formosa (Jordan & Evermann).

Family SERRANIDÆ.

141. **Psammoperca waigiensis** (Cuvier & Valenciennes).
Formosa (Jordan & Evermann).

142. **Lateolabrax japonicus** (Cuvier & Valenciennes).
Keerun ; Formosa (Jordan & Evermann).

143. **Epinephelus tauvina** (Forskål).
(Native name *Loh wah.*)
Nine specimens from Takao, three to eight inches long. Dorsal XI, fourteen or fifteen ; teeth in sides of lower jaw in two rows.
Keerun (Jordan & Evermann).

144. **Epinephelus moara** (Temminck & Schlegel).
A single large specimen, twenty-three inches long, from Takao.

145. **Epinephelus chlorostigma** (Cuvier & Valenciennes).
One large specimen, eighteen inches long, from Takao. It does not appear to differ from Japanese examples.
Keerun (Jordan & Evermann).

146. **Epinephelus awoara** (Temminck & Schlegel).
Two specimens, one eight and one half inches, the other fifteen inches long, from Takao. Mr. Sauter states that the color in life is "light brown, with the under parts suffused with yellow ; fins grey, with yellow borders." The specimens in spirits show five indistinct broad cross-bands, and the large one has traces of pale spots on the head and the lower anterior part of the sides. A full description, with figure is reserved for publication in a paper in preparation on the serranoid fishes of Japan.

147. **Epinephelus fuscoguttatus** (Forskål).
Formosa (Jordan & Evermann).

148. **Epinephelus epistictus** (Temminck & Schlegel).
Giran ; Formosa (Jordan & Evermann).

149. **Epinephelus diacanthus** (Cuvier & Valenciennes).
Formosa (Jordan & Evermann).

150. **Epinephelus höedti** (Bleeker).
Formosa (Jordan & Evermann).

151. **Promicrops lanceolata** (Bloch).

Formosa (Jordan & Evermann).

Family LUTIANIDÆ.

152. **Lutianus argentimaculatus** (Forskål).

(Native name *Ang tsoh.*)

One specimen from Takao, ten and one-half inches long. Keerun (Jordan & Evermann).

153. **Lutianus fuscescens** (Cuvier & Valenciennes) = *Mesoprion hoteen* Richardson.

Five specimens, three to five inches long, from Takao. Specimens from Keerun, called *Lutianus fulviflamma* by Jordan & Evermann, probably belong to this species.

154. **Lutianus quinquelineatus** (Bloch)?

Four small specimens, two inches long, from Takao.

155. **Lutianus fulviflamma** (Forskål).

(Native names *Chan tsi ah*; *Chiochi.*)

Three specimens from Takao, two and one-half to four inches long, agreeing perfectly with the ones obtained by Mr. McGregor at Cuyo, Philippine Islands, and recorded by Jordan & Richardson as *Lutianus russelli*.

156. **Lutianus annularis** (Cuvier & Valenciennes).

Formosa (Jordan & Evermann).

157. **Lutianus kasmira** (Forskål).

One specimen, three inches long, from Takao.

158. **Lutianus vitta** (Quoy & Gaimard).

(Native name *Si Kong.*)

Two specimens, eight inches long, from Takao. Keerun (Jordan & Evermann).

159. **Lutianus lineolatus** (Rüppell).

A specimen from Takao, seven and one-half inches long, is referred with some doubt to this species. It bears a general resemblance to *L. vitta*, but is well distinguished from that species by its slenderer body, larger eye, and longer pectoral. Depth 3.1; eye 3.2; pectoral nearly equal to head; a faint dusky stripe, less than width of pupil, from middle of eye to base of caudal, and three or four narrower and fainter ones below it; the posterior nostril is notably small, being more roundish and less slit-like than in most species of *Lutianus*.

160. **Lutianus rivulatus** (Cuvier & Valenciennes).

Two specimens, two and one-half to three inches long, from Takao.

161. **Lutianus erythropterus** Bloch.

(Native name *Hai ling.*)

Four specimens, four to eight inches long, from Takao.

162. ***Glaucosoma burgeri*** Richardson.

Two large specimens from Takao.

Keerun (Jordan & Evermann).

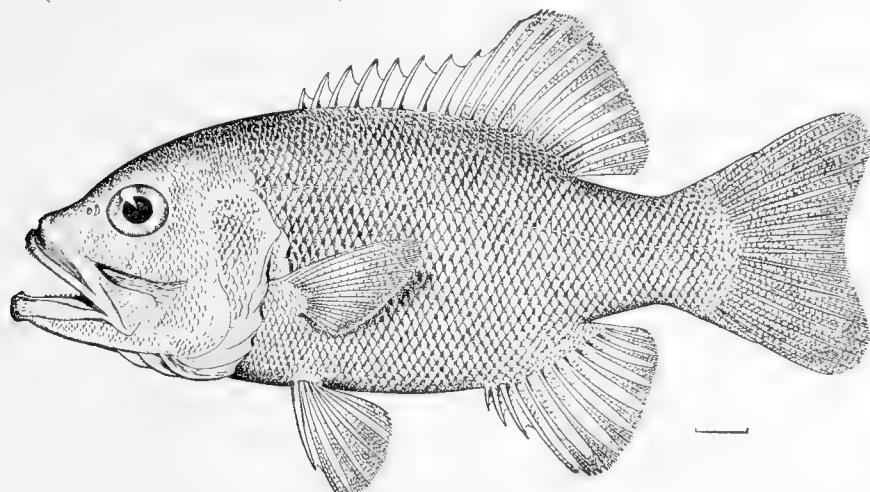


FIG. 13. *Glaucosoma burgeri* Richardson. (After Jordan & Evermann, Proc. U. S. N. M., Vol. 25, p. 342.)

163. ***Platyinius sparus*** (Temminck & Schlegel).

Formosa (Jordan & Evermann).

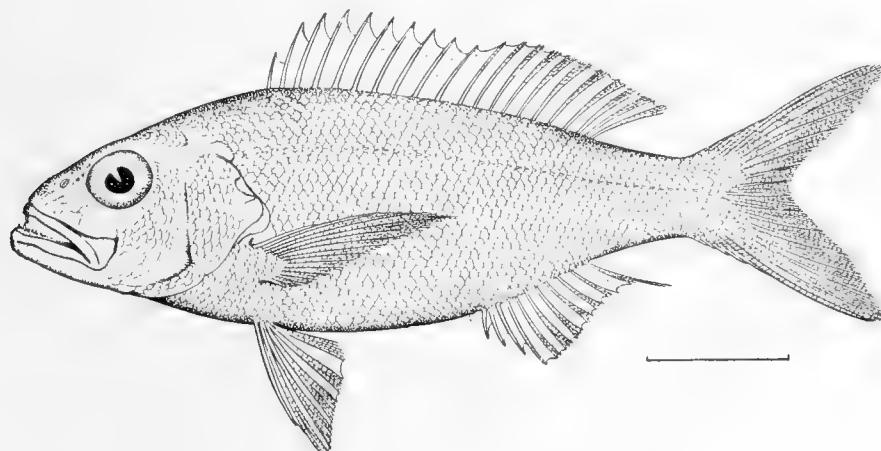


FIG. 14. *Platyinius sparus* (Tem. & Schleg.). (After Jordan & Evermann, Proc. U. S. N. M., Vol. 25, p. 344.)

164. ***Dentex hypselosomus*** Bleeker. (For figure see p. 186.)

(Native name *Ga lah.*)

Three specimens, nine inches long, from Takao.

Formosa (Jordan & Evermann.)

165. ***Nemipterus ovenii*** (Bleeker).

(Native name *Ang hii.*)

Five specimens from Takao, seven to eight and one half inches long.

166. **Nemipterus virgatus** (Houttuyn).

Keerun (Jordan & Evermann).

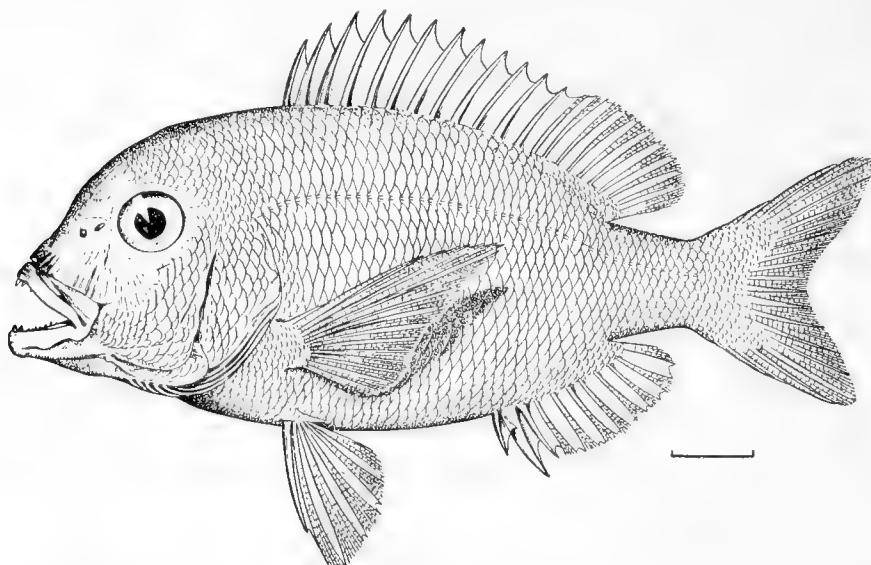


FIG. 15. *Dentex hypselosomus* Bleeker. (After Jordan & Evermann, Proc. U. S. N. M., Vol. 25, p. 345.)

167. **Nemipterus matsubaræ** Jordan & Evermann.

Giran (Jordan & Evermann).

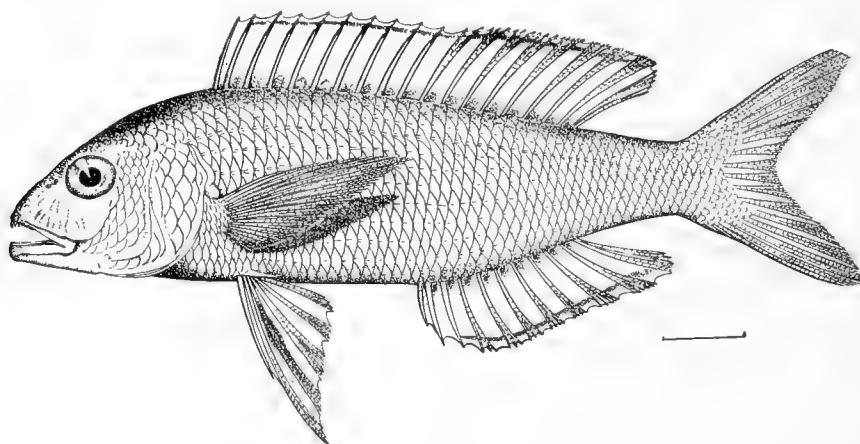


FIG. 16. *Nemipterus matsubaræ* J. & E. (After Jordan & Evermann, Proc. U. S. N. M., Vol. 25, p. 347.)

168. **Nemipterus japonicus** (Bloch) = *Synagris japonicus* of Day, not of Günther.

A specimen, eleven and one half inches long, from Takao, agrees fairly well with Day's description and figure, but the serrature of the preopercular edge is very faint, and the dorsal rays are only eight in number. Day examined Bloch's type in Berlin.

Family HÆMULIDÆ.

169. **Terapon theraps** (Cuvier & Valenciennes).
Keerun (Jordan & Evermann).

170. **Terapon cancellatus** (Cuvier & Valenciennes).
Kotosho (Jordan & Evermann).

171. **Terapon quadrilineatus** (Bloch).
Two specimens, one and one half to three inches long, from Takao.
Giran ; Keerun (Jordan & Evermann).

172. **Terapon jarbua** (Forskål).
Two specimens, eight inches long, from Takao.
Formosa (Jordan & Evermann).

173. **Terapon sexlineatus** (Quoy & Gaimard).
One specimen, five inches long, from Takao.

174. **Plectorhynchus oxyurus** Jordan & Evermann.
Formosa (Jordan & Evermann).

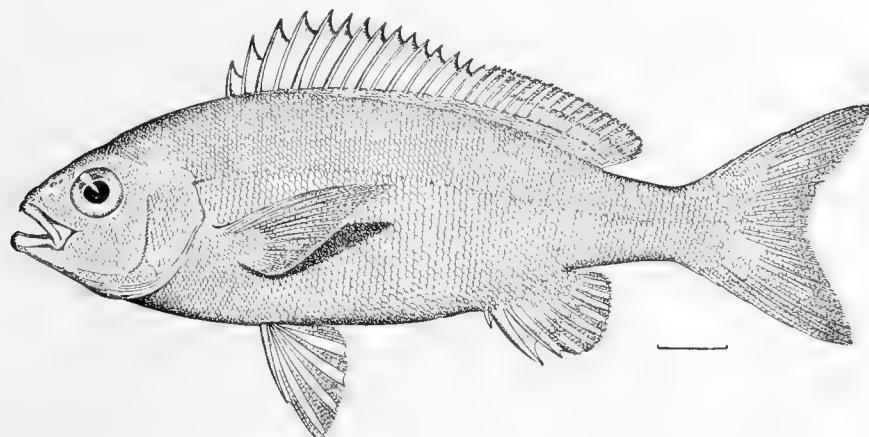


FIG. 17. *Plectorhynchus oxyurus* J. & E. (After Jordan & Evermann, Proc. U. S. N. M., Vol. 25, p. 348.)

175. **Plectorhynchus radjaban** (Lacépède).
Formosa (Jordan & Evermann).

176. **Plectorhynchus pœcilopterus** (Cuvier & Valenciennes).
Keerun ; Giran (Jordan & Evermann).

177. **Pomadasis hasta** (Bloch).
One specimen, eleven inches long, from Takao.
Keerun (Jordan & Evermann).

178. **Pomadasis maculatus** (Bloch).
Three specimens, eight inches long, from Takao.
Keerun (Jordan & Evermann).

179. **Scolopsis vosmeri** (Bloch).

One specimen, four and one-half inches long; from Takao.

Keerun (Jordan & Evermann).

180. **Scolopsis monogramma** (Kuhl & Van Hasselt).

Giran; Keerun (Jordan & Evermann).

181. **Scolopsis eriomma** sp. nov. (Plate LXX.)

Head 3.4; depth 2.6; width 2.4 in depth; eye 2.9; snout 1.3 in eye; maxillary 2.75 in head; interorbital space equal to eye; dorsal X, 9; anal III, 7; scales 3-48-12. Body oblong, compressed, dorsal and ventral outlines about equally arched; head short, muzzle rather rounded than pointed; mouth moderate, oblique, lower jaw slightly projecting; back of maxillary under front of pupil; teeth in jaws fine, villiform, in broad bands, a few of the outer ones slightly enlarged as very weak canines; vomer, palatines, and tongue without teeth; eye very large, its diameter one-third greater than length of snout; posterior limb of preopercle very finely but distinctly serrate; opercle with a short but strong and sharp spine; depth of infraorbital over back of maxillary less than one-third of eye, its lower hinder edge with several small serratures, the upper one of which is strongest; nostrils moderate, subequal; gill-rakers eleven on lower limb of outer arch, their length about half that of the corresponding filaments; the larger rakers terminating in a flattish, disk-like expansion, which is fringed. Scales very large, ctenoid; cheeks with three rows behind eye, four below it; lateral line complete, arched, about parallel with back; pores thirty-five. Dorsal fins continuous, the spines strong and stiff, the longest (fourth or fifth) 2.25 in head; origin of dorsal over base of pectoral; insertion of anal slightly in front of second soft ray of dorsal; caudal moderately forked, the lobes subequal; pectoral nearly as long as head, pointed, reaching past tips of ventrals and nearly to vent; ventrals 1.4 in head.

Color in alcohol light straw, tinged with pinkish along middle of side; belly whitish; no black markings on body or fins. (The color in life was probably reddish.)

Described from three specimens from Takao, in excellent condition, eight to nine inches long. Vernacular name said by Mr. Sauter to be *Dai hii* or *Hai tai*.

182. **Cæsio chrysazona** (Kuhl & Van Hasselt).

Keerun (Jordan & Evermann).

183. **Cæsio bille** Cuvier & Valenciennes.

Keerun (Jordan & Evermann).

184. **Anoplus banjos** (Bleeker).

Formosa (Jordan & Evermann).

Family SPARIDÆ.

185. **Lethrinus amboinensis** Bleeker.

(Native name *Leng tsian*.)

Six specimens, three to six inches long, from Takao.

Depth 2.6; head 2.8; snout $1\frac{1}{2}$ times eye; teeth conical. The cross-bars on body show plainly in the specimens, and the ventrals are barred, not plain, or with diffuse dusky, as in many species of *Lethrinus*. The specimens from the Lung collection recorded by Jordan & Seale as *Lethrinus amboinensis* have the ventrals plain, and are probably a different species.

186. **Lethrinus leutjanus** (Bloch).

Giran (Jordan & Evermann).

187. **Lethrinus richardsoni** Günther.

Formosa (Jordan & Evermann).

188. **Lethrinus insulindicus** Bleeker.

We provisionally refer a specimen eleven inches long from Takao to this species. The depth is 2.6; nose $2\frac{1}{2}$ times eye. There are traces of dark cross-bars on the upper portion of the sides and a suggestion of a dusky blotch under the lateral line forward; ventrals plain. A color note by Mr. Sauter states that in life the "general color was light greenish-brown, whitish beneath; iris yellow; opercular flap and base of pectoral crimson; caudal dusky, suffused with red; hind part of dorsal red; membranes of anal reddish at border." This description agrees well with the coloring in Bleeker's plate.

189. **Pagrus major** (Temminck & Schlegel).

(Native name *Ga la hii*.)

One specimen, eleven inches long, from Takao.

Formosa (Jordan & Evermann).

190. **Pagrus cardinalis** (Temminck & Schlegel).

Formosa (Jordan & Evermann).

191. **Argyrops longifilis** (Cuvier & Valenciennes).

(Native name *Poa'n*.)

Two specimens from Takao, seven and one-half inches long.

Kotosho (Jordan & Evermann).

192. **Sparus berda** Forskål.

Formosa (Jordan & Evermann).

193. **Sparus latus** Houttuyn.

Giran (Jordan & Evermann).

194. **Sparus longispinus** (Temminck & Schlegel).

(Native name *Ang ke*.)

A fine specimen from Takao, twelve inches long, agrees in all essential respects with the original description and figure by Temminck & Schlegel of the type from Japan.

Family KYPHOSIDÆ.

195. **Girella mezina** Jordan & Starks.

One example, eleven and one-half inches long, in good color, was received from Takao. It is very dark in color, the pale cross-bar shown in the original type being entirely obliterated. Apparently this marking, like the white spot on the back of the related California species, *Girella nigricans*, is a character of youth. The *Crenidens leoninus* of Richardson from Canton after a figure of Reeves may be this species, or it may be the Japanese species called *Crenidens melanichthys* by Richardson and *Girella leonina* by Jordan & Starks (Proc. U. S. Nat. Mus., 1907, p. 497). In view of this uncertainty, until we know which species occur at Canton, we may use the name *Girella melanichthys* for this species, which is the *Melanichthys* of Temminck & Schlegel. There are thus three species of *Girella* in the waters of southern Japan and Formosa. These are, *Girella punctata* Gray, *Girella melanichthys* Richardson (= *Melanichthys* Schlegel = *Girella leonina* Jordan & Starks, perhaps not *Crenidens leoninus* Richardson) and *Girella mezina* Jordan & Starks (perhaps = *Crenidens leoninus* Richardson). Temminck & Schlegel describe and figure the opercle in *Melanichthys* as scaled throughout, which is not the case. The figure shows the more oblong form and general profile of the fish we call here *Girella melanichthys*.

The type of *Girella punctata* came also from Canton. The description of Dr. Günther (Cat. I, p. 427) evidently includes *Girella melanichthys* as well as *Girella punctata*.

Family GERRIDÆ.

196. **Xystæma punctatum** (Cuvier & Valenciennes).

Three specimens from Takao, four to seven inches long. Of fifteen specimens examined from the Philippines and Formosa none had more than seven anal rays. This is the *Xystæma punctatum* of Jordan & Seale and probably also the original *Gerres punctatus* of Cuvier & Valenciennes.

Kotosho (Jordan & Evermann).

197. **Xystæma abbreviatum** (Bleeker).

(Native name *O-ke.*)

One specimen from Takao, four inches long. The anal has eight rays, though two young specimens from Cavite have only seven. These were not distinguished from *X. punctatum* by Jordan & Seale. This is, however, a shorter, deeper-bodied

fish than *X. punctatum (filamentosum)*, has thicker and less flexible, dorsals pines, and has a dark spot on each scale above the lateral line, and four or five less distinct rows of such spots below it.

Family SCIENIDÆ.

198. **Pseudotolithus brunneolus** sp. nov. (Plate LXXI.)

(Native name *Ga bang he.*)

Head 3.40; depth 4; eye 4 in head; nose 4; maxillary 2.2; interorbital 4; dorsal X, 30-31; anal II, 7-8; scales 8-56-13. Body moderately elongate, compressed; head bluntly pointed; mouth large, oblique; jaws equal; maxillary reaching slightly past the middle of the orbit; interorbital space slightly convex, nearly flat; opercle with a weak flat spine; upper and lower limb of preopercle each with a few small and weak denticles; gill-rakers on lower limb of outer arch twelve, counting rudiments, the longest equal in length to the corresponding filaments, less than one-half eye; teeth of upper jaw in two series, the outer consisting of a single row, strong, recurved, and canine-like; the inner villiform teeth presenting the appearance of a band in the posterior half of the jaw, but forming a single or nearly single row anteriorly; sides of lower jaw with canine-like teeth in a single row; some smaller teeth behind the canines at the symphysis. Origin of dorsal slightly behind that of pectorals; spinous and soft dorsals connected by a low membrane; third dorsal spine longest, 2.6 in head; anal spines weak, the second spine half the length of the longest rays; origin of anal under middle of soft dorsal, its base 4.7 in head; ventrals 1.5 in head; pectorals 1.2; caudal rhomboidal, 1.4 in head. Entire body and head scaled, except maxillary and lower jaw; lateral line complete, extending to end of caudal, the pores branched, 54 to 56 in number to base of caudal.

Color in spirits brownish above; paler (silvery), more or less densely punctuated with dusky on belly, breast, and lower parts of head and under jaws; a large diffuse dark blotch on opercle; spinous dorsal dusky, darkest on outer two-thirds; soft dorsal dusky, somewhat darker along margin; anterior part of anal brown-specked; posterior half of pectorals dusky; ventrals plain.

Described from three specimens, eight inches long, from Takao. We refer this species to the genus *Pseudotolithus* Bleeker, as a provisional matter. It is not clear that this genus differs from *Pseudosciaena* and it has much in common with *Odon-torcion* and with *Corvula*.

199. **Corvula argentata** Houttuyn.

Formosa (Jordan & Evermann).

Family SILLAGINIDÆ.

200. **Sillago sihama** (Forskål).

Eight specimens from Takao, three to six inches long.
Formosa (Jordan & Evermann).

201. **Sillago æolus** Jordan & Evermann.

Keerun (Jordan & Evermann).

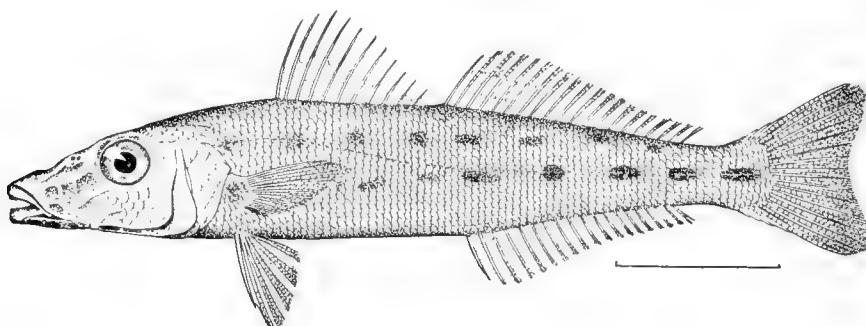


FIG. 18. *Sillago volus* J. & E. (After Jordan & Evermann, Proc. U. S. N. M., Vol. 25, p. 360.)

Family PENTACEROTIDÆ.¹

202. **Histiopterus typus** Temminck & Schlegel.

One specimen, Takao, twelve inches long.

Family PRIACANTHIDÆ.

203. **Priacanthus tayenus** Richardson.

(Native name *Giam kong*.)

Three specimens, ten inches long, from Takao, two males and one female. The female lacks the dorsal and upper caudal filament and the conspicuous black spots on the inside of the pectoral.

Family LATILIDÆ.

204. **Latilus japonicus** (Houttuyn).

Three specimens from Takao, ten to thirteen inches long.

Giran (Jordan & Evermann).

Family MULLIDÆ.

205. **Upeneus indicus** (Shaw).

(Native name *Hai tai*.)

¹ The name *Pentaceros* Cuvier & Valenciennes is apparently not preoccupied, as recently supposed by Jordan, Proc. U. S. M., XXXII, 1907, p. 233. The first use of the name *Pentaceros* for a starfish by Schultze, 1760, is non-binomial, according to Dr. Walter K. Fisher.

Eight specimens from Takao, three to ten inches long.
 Keerun; Giran (Jordan & Evermann).

206. **Upeneus ischyurus** Snyder.
 One large specimen from Takao, ten inches long.

207. **Upeneus cyclostomus** Lacépède.
 (*Upeneus luteus* Cuvier & Valenciennes.)
 Keerun (Jordan & Evermann).

208. **Upeneoides bensasi** (Temminck & Schlegel).
 Three young specimens from Takao, three inches in length.
 Keerun; Kotosho (Jordan & Evermann).

209. **Upeneoides tragulus** (Richardson).
 (Native name *Hoe sin.*)
 Seven specimens from Takao, four to ten inches long.
 Giran; Keerun; Hokoto (Jordan & Evermann).

210. **Upeneoides vittatus** (Forskål).
 Keerun (Jordan & Evermann).

Family OPHICEPHALIDÆ.

211. **Ophicephalus tadianus** Jordan & Evermann.
 (Native name *Lochii.*)

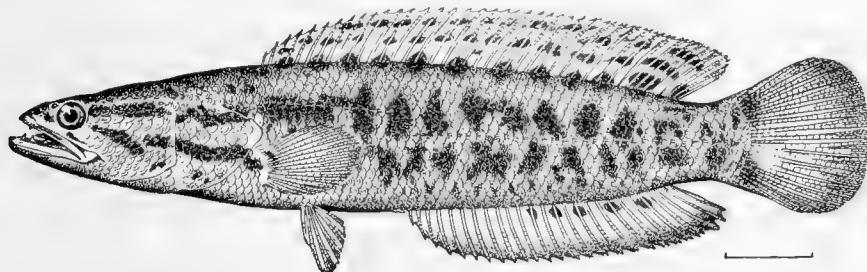


FIG. 19. *Ophicephalus tadianus* J. & E. (After Jordan & Evermann, Proc. U. S. N. M., Vol. 25, p. 331.)

Eight large specimens, eight to fifteen inches long, from Takao. This species is allied to *O. polylepis* from Sumatra, as noted by Dr. Steindachner, but has a much larger mouth.

212. **Ophicephalus maculatus** Lacépède.
 Giran (Jordan & Evermann).

213. **Channa formosana** Jordan & Evermann.
 Suwata (Jordan & Evermann).

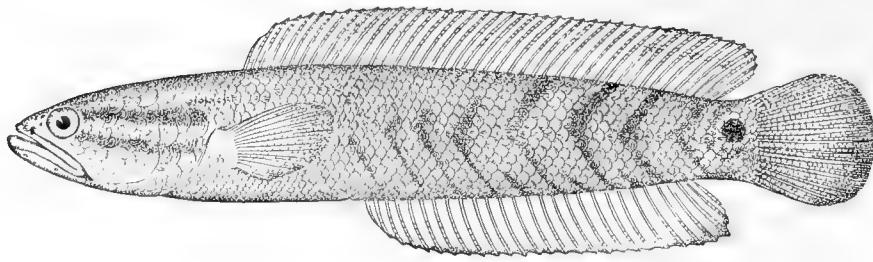


FIG 20. *Channa formosana* J. & E. (After Jordan & Evermann, Proc. U. S. N. M., Vol. 25, p. 332.)

Family CHEILODACTYLIDÆ.

214. **Goniistius zonatus** (Cuvier & Valenciennes).

One specimen from Takao, twelve inches long.

Family SCORPÆNIDÆ.

215. **Sebastapistes tristis** (Klunzinger).

(Native name *Ho hii*.)

Seven small specimens from Takao, two and one-half inches long.

Family PLATYCEPHALIDÆ.

216. **Platycephalus indicus** (Gmelin).

One specimen from Takao, fourteen inches long.

217. **Thysanophrys scaber** (Linnaeus).

Takao, one specimen five inches long.

218. **Thysanophrys japonicus** (Tilesius).

(? *Silurus inermis* Houttuyn.)

(Native name *Gu bo*.)

One specimen from Takao, seven inches long.

Family POMACENTRIDÆ.

219. **Abudefduf saxatilis** (Linnaeus).

Formosa (Jordan & Evermann).

220. **Abudefduf sordidus** (Forskål).

Kotosho (Jordan & Evermann).

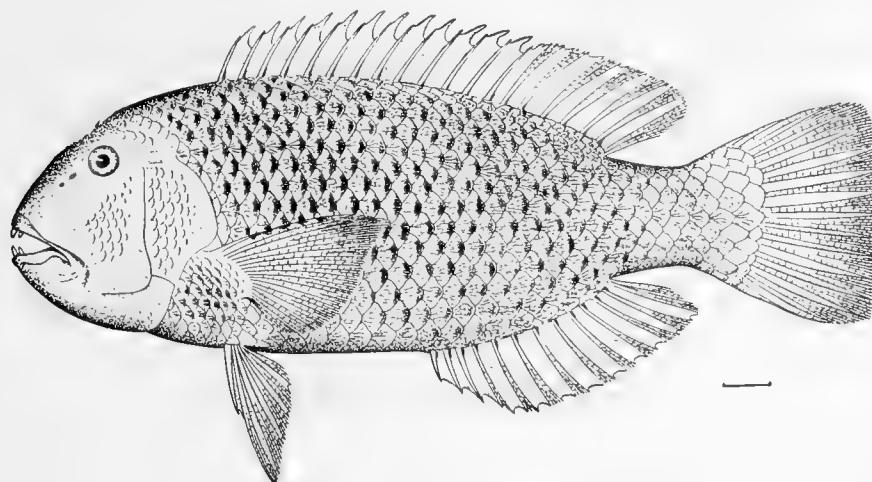
Family LABRIDÆ.

221. **Choirodon azurio** (Jordan & Snyder).

Keerun (Jordan & Evermann).

222. ***Choirodon nyctemblema*** (Jordan & Evermann).

Formosa (Jordan & Evermann).

FIG. 21. *Choirodon nyctemblema* J. & E. (After Jordan & Evermann, Proc. U. S. N. M., Vol. 25, p. 353.)223. ***Duymæria flagellifera*** (Cuvier & Valenciennes).

Keerun (Jordan & Evermann).

224. ***Anampses cœruleopunctatus*** (Rüppell).

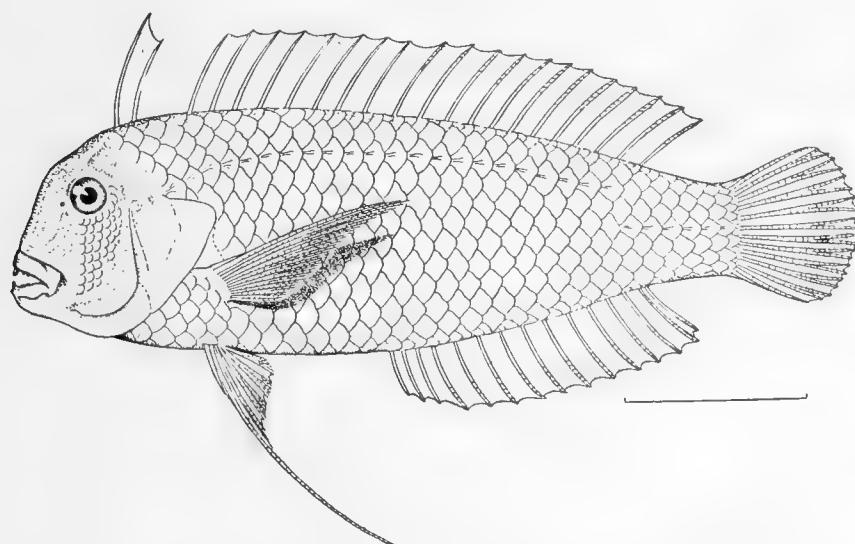
Formosa (Jordan & Evermann).

225. ***Halichœres dussumieri*** (Cuvier & Valenciennes) = *Halichœres nigrescens* Bleeker.

One specimen, Takao, three and one-half inches long.

226. ***Hemipteronotus verrens*** Jordan & Evermann.

Keerun (Jordan & Evermann).

FIG. 22. *Hemipteronotus verrens* J. & E. (After Jordan & Evermann, Proc. U. S. N. M., Vol. 25, p. 355.)

227. **Hemipteronotus pentadactylus** (Linnaeus).

Nine specimens from Takao, five to six inches long.

228. **Hemipteronotus evides** sp. nov. (Plate LXXII.)

Head 3.25 in length; depth 2.6; eye 4.7 in head; snout 3; interorbital equal to eye; dorsal II-VII, 12; anal III, 12; scales 3-28-8. Body short, deep, much compressed, the greatest width $3\frac{2}{3}$ in greatest depth; head short and deep, the anterior profile nearly vertical; a depression over eye; eye high, nearly half of length of head above angle of mouth; mouth rather small, nearly horizontal, maxillary not reaching front of eye, 3 in head; teeth in jaws small, sharp, close set in a single row; two outwardly-directed recurved canines at front of each jaw. Scales thin; cheeks with smaller scales, in four or five rows; rest of head naked; lateral line high, continuous to near end of dorsal, where it breaks, to be continued on the third scale row below. Dorsal inserted over back of eye, the first two spines separated from the others by a deep notch, but not detached; length of second spine 2.4 in head; origin of anal under second ray of soft dorsal; caudal rounded; pectoral 1.3 in head, its free margin nearly straight; ventral with outer ray produced, reaching past front of anal.

Color in spirits dull greenish-olive; under posterior third of spinous dorsal an oblique blotch of black surrounded by pale, the black covering most of three scales; dorsals and caudal with many small pale specks on a dusky ground; anal obliquely barred with dusky; ventrals plain; pectorals dusky.

Described from two specimens from Takao, four and five inches long.

229. **Cheilio inermis** (Forskal).

Three examples from Takao, seven inches long.

Formosa (Jordan & Evermann).

Family SCARICHTHYIDÆ.

230. **Scarichthys auritus** (Kuhl & Van Hasselt).

One specimen from Takao, seven inches long.

231. **Calotomus waigiensis** (Quoy & Gaimard).

(*Callyodon spinidens* Cuvier & Valenciennes.)

Four specimens from Takao, three and one-half to four inches long.

232. **Callyodon dussumieri** (Cuvier & Valenciennes). (Plate LXXIII.)

(Native name *Eng kochu*.)

A fine specimen twelve inches long from Takao, agreeing with Bleeker's figure and description of *Pseudoscarus dussumieri*, but with the right canine rather small and the left wanting. Valenciennes states that *Scarus dussumieri* has no canines at the angle of the jaws, but the description is based merely on a drawing.

233. **Callyodon lacerta** (Cuvier & Valenciennes).

Formosa (Jordan & Evermann).

Family SCATOPHAGIDÆ.

234. **Scatophagus argus** (Gmelin).

One specimen from Takao, seven inches long.

Suwata and Giran (Jordan & Evermann).

Family EPHIPPIDÆ.

235. **Ephippus orbis** (Bloch).

Three specimens from Takao, six inches long.

Formosa (Jordan & Evermann).

The genus *Ephippus* of Cuvier includes *argus* and *orbis*, the former in the text, the latter in a footnote. The first restriction of the genus, that of Cuvier & Valenciennes, makes *orbis* the type of *Ephippus*. We have therefore so regarded it, in spite of the fact that it was not named in the text of the account of *Ephippus*, but only in a footnote. This view may be open to question.

Family PLATACIDÆ.

236. **Platax teira** (Forskål).

One specimen from Takao.

Formosa (Jordan & Evermann).

Family CHÆTODONTIDÆ.

237. **Chætodon reticulatus** Cuvier & Valenciennes.

Formosa (Jordan & Evermann).

238. **Chætodon lineolatus** (Cuvier & Valenciennes).

Pescadores Islands (Jordan & Evermann).

239. **Chætodon lunula** Lacépède.

Kotosho (Jordan & Evermann).

240. **Chætodon citrinellus** Cuvier & Valenciennes.

Kotosho (Jordan & Evermann).

241. **Microcanthus strigatus** (Cuvier & Valenciennes).

Formosa (Jordan & Evermann).

Family HEPATIDÆ.

242. **Hepatus triostegus** (Linnaeus).

Kotosho (Jordan & Evermann).

243. **Hepatus dussumieri** (Cuvier & Valenciennes).

Formosa (Jordan & Evermann).

244. **Hepatus bipunctatus** (Günther).

Kotosho (Jordan & Evermann).

245. **Hepatus olivaceus** (Bloch & Schneider).

Formosa (Jordan & Evermann).

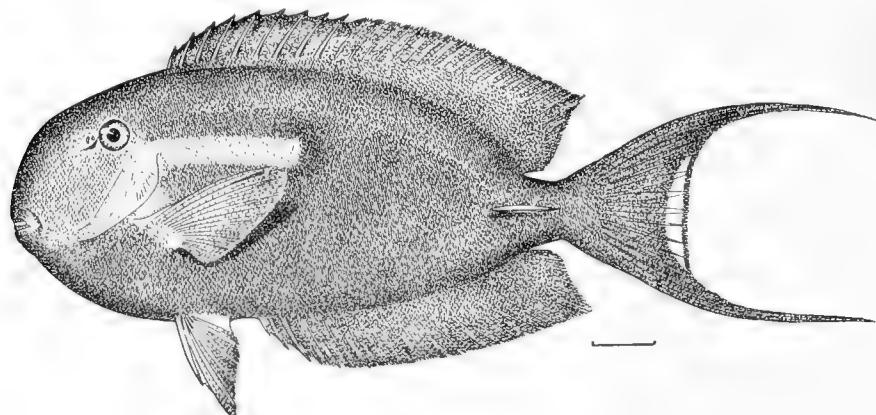


FIG. 23. *Hepatus olivaceus* (Bl. & Schneid.). (After Jordan & Evermann, Proc. U. S. N. M., Vol. 25, p. 358.)

Family SIGANIDÆ.

246. **Siganus virgatus** (Cuvier & Valenciennes).

(Native name *Trau toh.*)

Two specimens from Takao, three inches long.

247. **Siganus vermiculatus** (Kuhl & Van Hasselt).

Suwata (Jordan & Evermann).

248. **Siganus fuscescens** (Houttuyn).

Three specimens, three to eight inches long, from Takao.

Keerun (Jordan & Evermann).

249. **Siganus guttatus** (Bloch).

(Native name *Niu e.*)

One example, eight inches long, from Takao. Specimens from southern Negros, P. I., recorded by Jordan & Seale as *Siganus lineatus* belong to this species. Others called *Siganus lineatus* from the Philippines belong to the next species, whatever that may prove to be.

250. **Siganus lineatus** (Cuvier & Valenciennes)?

(Native name *Niu e.*)

Two small specimens, three inches long, from Takao, are referred with considerable doubt to this species. They are apparently identical with specimens from

Manila and Cuyo, P. I., called *Siganus lineatus* by Jordan & Seale and Jordan & Richardson. (Bull. U. S. Bur. Fish., XXVI, 35, 1907, and XXVII, 271, 1908). A field note on the Cuyo specimen mentions a "large golden-yellow spot at back of dorsal," as in *Siganus lineatus*, which does not show in spirits. The preserved specimens all show some small dark spots about the caudal peduncle and on caudal, dorsal, and anal. None of them show the linear dark markings on the body figured by Cuvier & Valenciennes. Only a thorough comparison of many specimens, with perhaps an examination of original types, can show what names these and other species of *Siganus* should bear.

FAMILY MONACANTHIDÆ.

251. **Stephanolepis sulcatus** (Holland).

Keerun (Jordan & Evermann).

FAMILY TETRAODONTIDÆ.

252. **Tetraodon stellatus** (Bloch & Schneider).

One large specimen, fourteen inches long, from Takao.

253. **Spheroides lunaris** (Bloch).

(Native name *Gui hii.*)

Five specimens from Takao, ten to thirteen inches long.

254. **Spheroides ocellatus** (Osbeck).

Hokoto (Jordan & Evermann).

255. **Spheroides sceleratus** (Forster).

Hokoto (Jordan & Evermann).

FAMILY OSTRACIIDÆ.

256. **Ostracion cornutum** (Linnæus).

(Native name *Koh gong.*)

One large specimen from Takao, measuring seven inches in length to tip of tail.

Family DIODONTIDÆ.

257. **Diodon holacanthus** Linnæus.

Hokoto (Jordan & Evermann).

Family TRIGLIDÆ.

258. **Lepidotrigla alata** (Houttuyn).

(*Lepidotrigla bürgeri* Temminck & Schlegel.)

Hokoto (Jordan & Evermann).

Family CEPHALACANTHIDÆ.

259. **Dactyloptena japonica** (Bleeker).

Giran (Jordan & Evermann).

Family GOBIIDÆ.

260. **Eleotris oxycephala** Temminck & Schlegel.

One specimen from Takao, three and one-half inches long.

261. **Eleotris fusca** (Bloch & Schneider).

Suwata (Jordan & Evermann).

262. **Rhinogobius caninus** (Cuvier & Valenciennes).

Two specimens from Takao, three inches long.

263. **Rhinogobius giurinus** (Rutter).

Kotosho ; Taihoku (Jordan & Evermann, as *Ctenogobius platycephalus*).

264. **Glossogobius brunneus** (Temminck & Schlegel).

Kotosho ; Keerun (Jordan & Evermann).

265. **Glossogobius abacopus** sp. nov. (Plate LXXIV.)

Head to tip of lower jaw, 3 in length ; depth 5.5 ; eye 4 in head ; dorsal VI, 10 ; anal 10 ; scales 28-30 ; snout 3.5 in head ; maxillary 2.4 ; interorbital space slightly greater than width of pupil. Body elongate, rather depressed in front, tapering gradually backward to the depressed caudal peduncle ; depth of caudal peduncle 3.4 in head ; head pointed ; lower jaw projecting width of pupil ; mouth large, maxillary reaching vertical from back of pupil ; jaws, vomer, and palatines with rows of fine, sharp-pointed teeth ; tongue deeply notched ; origin of spinous dorsal nearly an eye-length behind insertion of ventrals, its base 2.4 in head ; base of soft dorsal 1.5 in head ; longest dorsal spine 2.25 ; longest ray 2 in head ; origin of anal under second ray of soft dorsal, equidistant between base of caudal and back of eye ; pectoral 1.3 in head ; ventrals 1.4 ; depth of membranous cup of united ventrals $\frac{2}{3}$ of length of eye ; caudal 1.3 in head, rounded ; a large anal papilla with notch behind.

Color in spirits brownish-olive, back and caudal peduncle crossed obliquely by four broad saddle-like bands of darker color ; membranes of dorsals and of anal chiefly blackish, with some small spot-like intervals of paler on these and on rays ; caudal and ventrals dark barred or checkered ; pectorals lightly specked with dusky, with darker and denser specks below at base ; under parts unevenly punctulated, the dots forming indistinct bars on chin and lower jaws ; tip of lower jaw blackish.

This species is near *Glossogobius vaisiganis* from Samoa, but differs distinctly in the details of coloration, notably in the sharply checkered ventral fin.

Described from four specimens from Takao, two and one-half inches long.

266. **Amblygobius phalæna** (Cuvier & Valenciennes).

Two specimens from Takao, three inches long.

267. **Amblygobius sphinx** (Cuvier & Valenciennes).

Three specimens from Takao, three to three and one-half inches long.

268. **Oxyurichthus papuensis** (Cuvier & Valenciennes).

Two specimens from Takao, three inches long.

269. **Oxyurichthus cristatus** (Day).

One specimen from Takao, three inches long. Scales 55; dorsal VI, 13; anal 14. The specimen seems to differ from specimens of this species from the Philippines in having a slightly larger mouth, and may not be the same.

Family ECHENEIDÆ

270. **Remora remora** (Linnaeus).

Two specimens from Takao, six inches long.

Family PLEURONECTIDÆ

271. **Psettodes erumei** (Bloch).

(Native name *Bin hii*.)

One fine specimen from Takao, twelve inches long.

272. **Pseudorhombus oligodon** (Bleeker).

Four specimens from Takao, seven inches long.

Formosa (Jordan & Evermann).

273. **Platophrys myriaster** (Temminck & Schlegel).

Keerun (Jordan & Evermann).

274. **Scæops orbicularis** (Bleeker).

A very small specimen from Takao, two inches long, is probably this species.

Family SOLEIDÆ

275. **Liachirus nitidus** Günther.

Giran (Jordan & Evermann).

276. **Synaptura orientalis** (Bloch and Schneider).

(*Synaptura foliacea* Richardson.)

Formosa (Jordan & Evermann).

277. **Usinosita japonica** (Temminck & Schlegel).

Keerun (Jordan & Evermann).

278. **Paraplagusia bilineata** (Bloch).

Keerun (Jordan & Evermann).

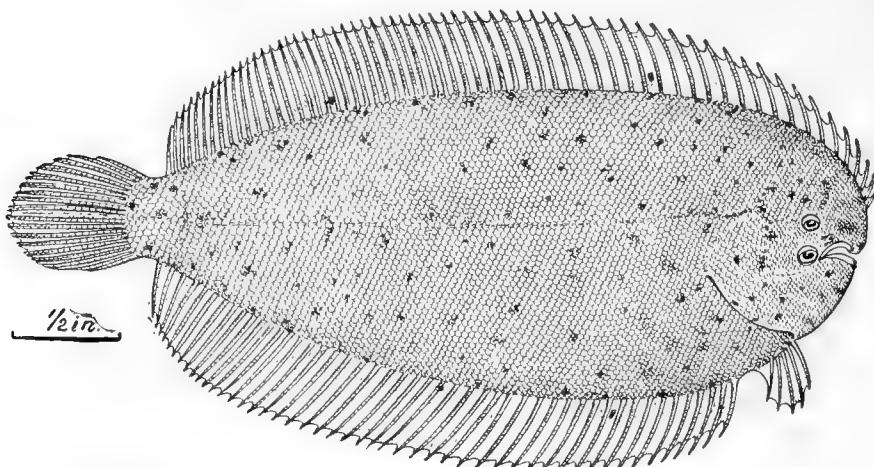


FIG. 24. *Liachirus nitidus* Günther. (After Jordan & Evermann, Proc. U. S. N. M., Vol. 25, p. 366.)

279. **Cynoglossus diplasios** Jordan & Evermann.

Formosa (Jordan & Evermann).

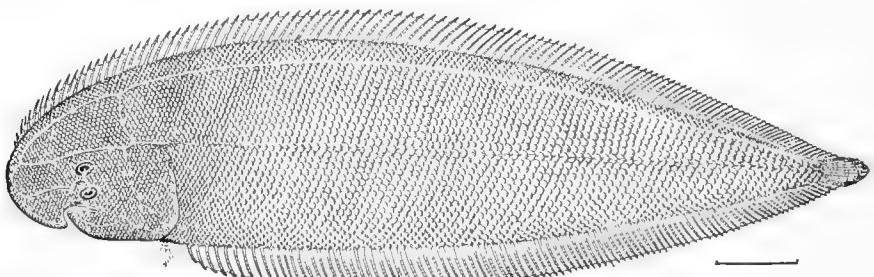


FIG. 25. *Cynoglossus diplasios* J. & E. (After Jordan & Evermann, Proc. U. S. N. M., Vol. 25, p. 367.)

280. **Zebrias zebra** (Bloch).

Formosa (Jordan & Evermann).

Family CALLIONYMIDÆ.

281. **Callionymus schaapii** Bleeker.

Head 3.2; depth 9; dorsal IV, 10; anal 9. Body moderately elongate, broader than deep and tapering gradually backward. Head broad, much depressed, its width two-thirds of its length, its depth 3 in its width; snout bluntly pointed, scarcely longer than eye; eyes close together, $4\frac{1}{2}$ in head; mouth small, inferior, the upper jaw projecting, maxillary reaching half way to orbit; jaws with bands of villiform teeth; preopercular spine with four or five strong teeth and sometimes a

rudiment directed upward, besides the hook at tip, and a sharp spine projecting forward from its base; occipital region weakly rugose; gill-opening about one-fourth diameter of eye, about equidistant between back of eye and origin of dorsal. Spinous dorsal inserted midway between back of eye and origin of soft dorsal; first and fourth dorsal spines longest, the first (specimens females) $2\frac{1}{3}$ in head; height of soft dorsal at its middle about one-third length of head; last ray elongated, about $1\frac{1}{4}$ in head; anal beginning a little behind second ray of soft dorsal; last ray of anal $2\frac{1}{2}$ in head; pectoral $1\frac{1}{4}$ in head, its median rays longest; ventrals reaching past origin of anal; caudal as long as head, its middle rays not produced; caudal peduncle depressed; lateral line single.

Color in spirits olive, rather heavily punctulated above, the punctulations on the back of the head and on the back as a rule encircling paler areas, some of which are more or less confluent; under parts pale; spinous and soft dorsals rather faintly splashed and specked with dusky; anal with a basal and a marginal row of brown blotches, the basal row smallest; ventrals dusky, brown-dotted on inner two-thirds; upper pectoral rays with dark specks.

Described from two specimens from Takao, two and one-half to three inches long, probably females.

This species is near and perhaps not different from *Callionymus schaapii* Bleeker described with dorsal IV-10, anal 10, six processes on preopercular spine, and with ventrals and anal black-edged. There is no point in which our species clearly differs from the scanty account given by Bleeker, whose specimen was from Banka.

Family BLENNIIDÆ.

282. ***Salarias namiyei* Jordan & Evermann.**

Hokoto or Pescadores Islands (Jordan & Evermann).

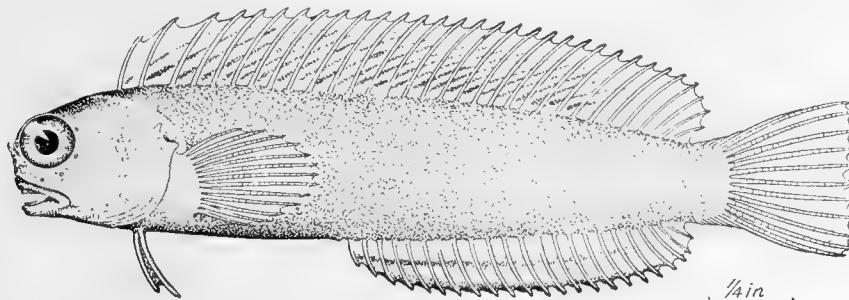


FIG. 26. *Salarias namiyei* J. & E. (After Jordan & Evermann, Proc. U. S. N. M., Vol. 25, p. 362.)

Family CEPOLIDÆ.

283. *Acanthocepola mesopriion* Bleeker.

Giran (Jordan & Evermann).

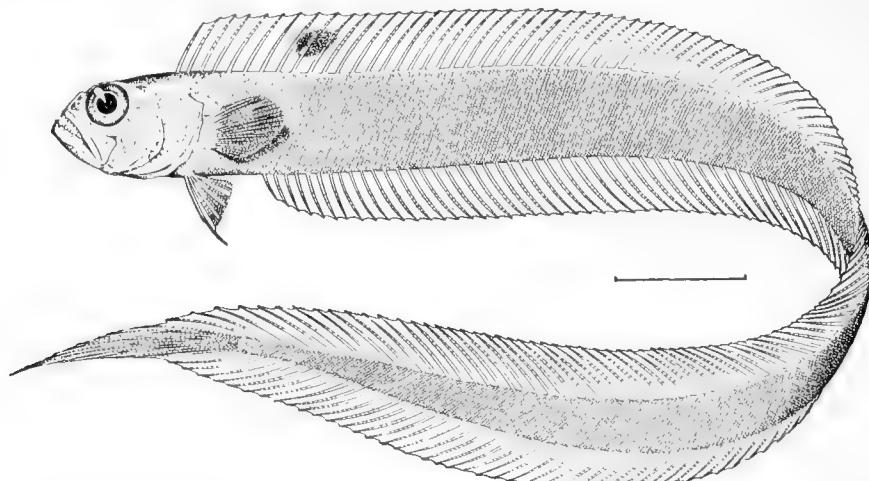


FIG. 27. *Acanthocepola mesopriion* Bleeker. (After Jordan & Evermann, Proc. U. S. N. M., Vol. 25, p. 363.)

Family AMMODYTIDÆ.

284. *Embolichthys mitsukurii* (Jordan & Evermann).

Giran (Jordan & Evermann, as *Bleekeria mitsukurii*).

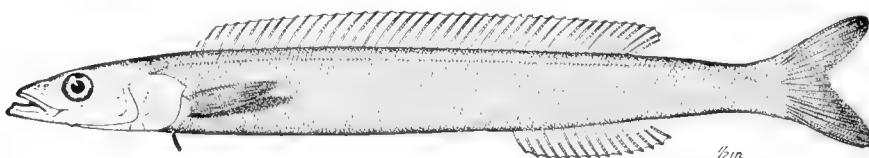


FIG. 28. *Embolichthys mitsukurii* J. & E. (After Jordan & Evermann, Proc. U. S. N. M., Vol. 25, p. 334.)

Family BROTLULIDÆ.

285. *Brotula multibarbata* Temminck & Schlegel.

Two specimens from Takao, fifteen inches long.

286. *Brotula formosæ* Jordan & Evermann.

Formosa (Jordan & Evermann).

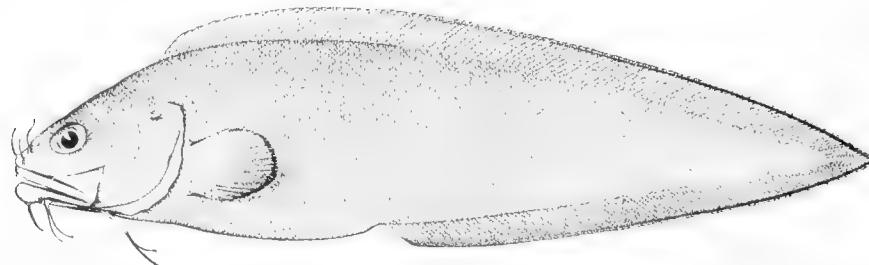
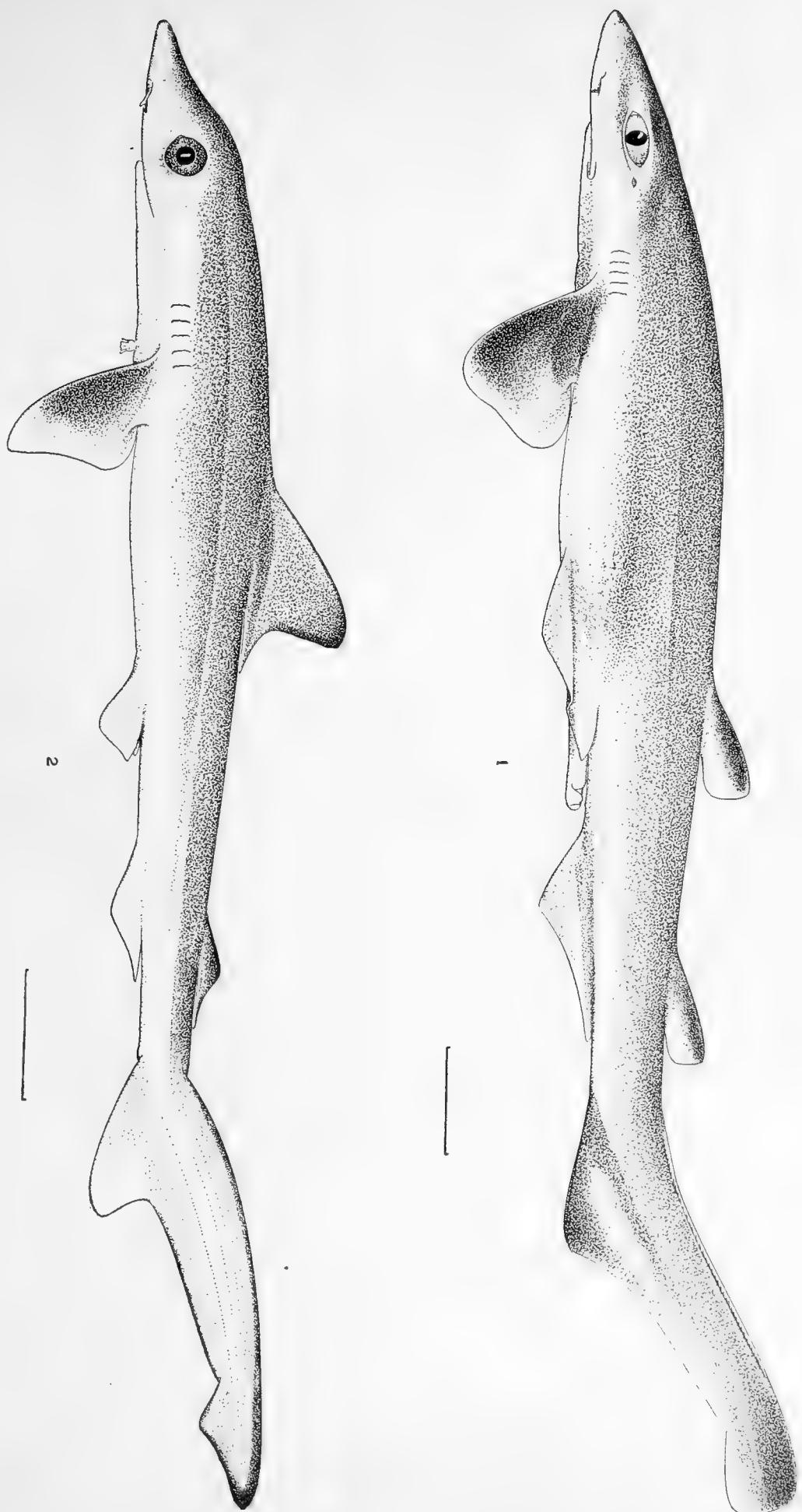
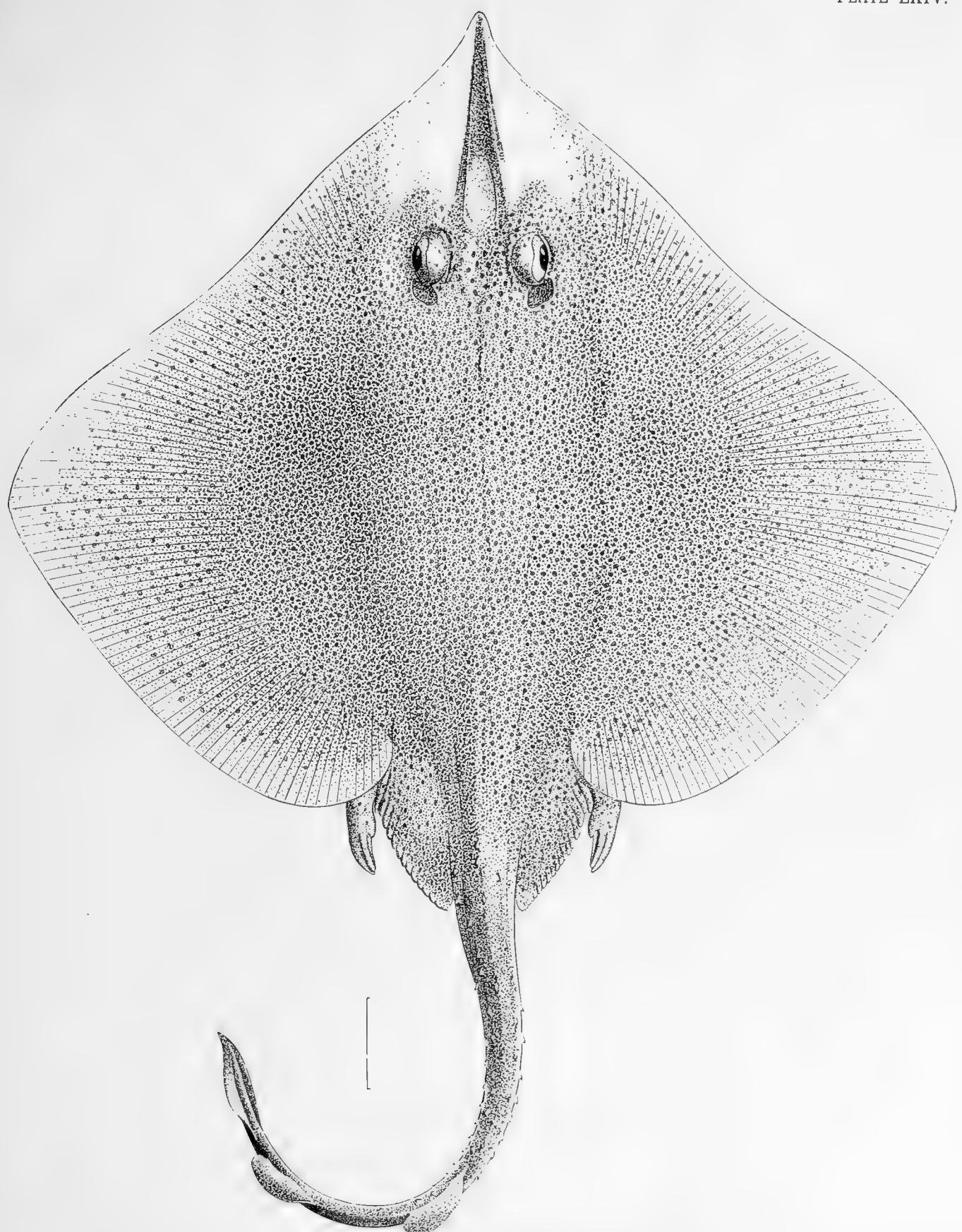


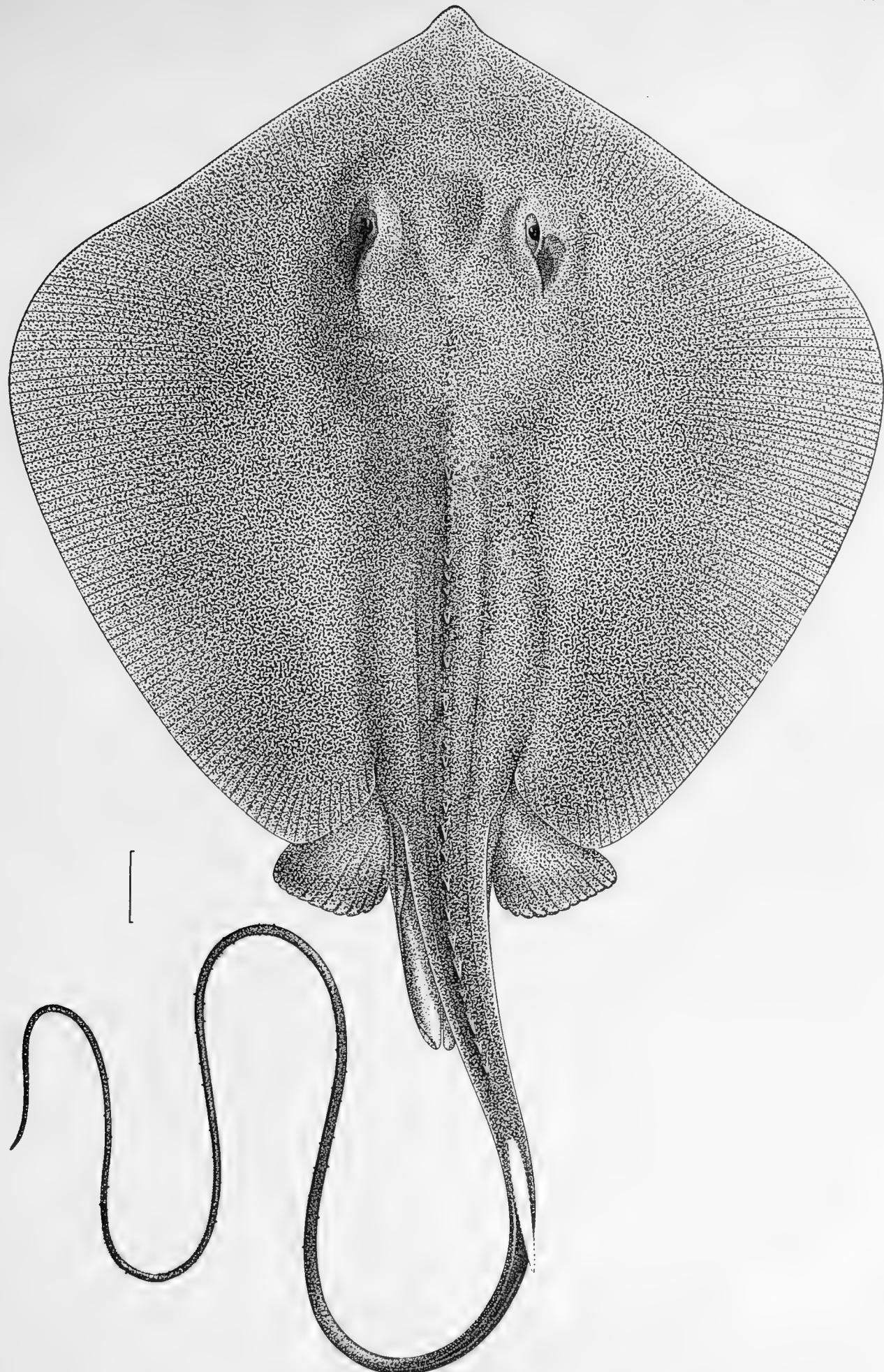
FIG. 29. *Brotula formosæ* J. & E. (After Jordan & Evermann, Proc. U. S. N. M., Vol. 25, p. 364.)



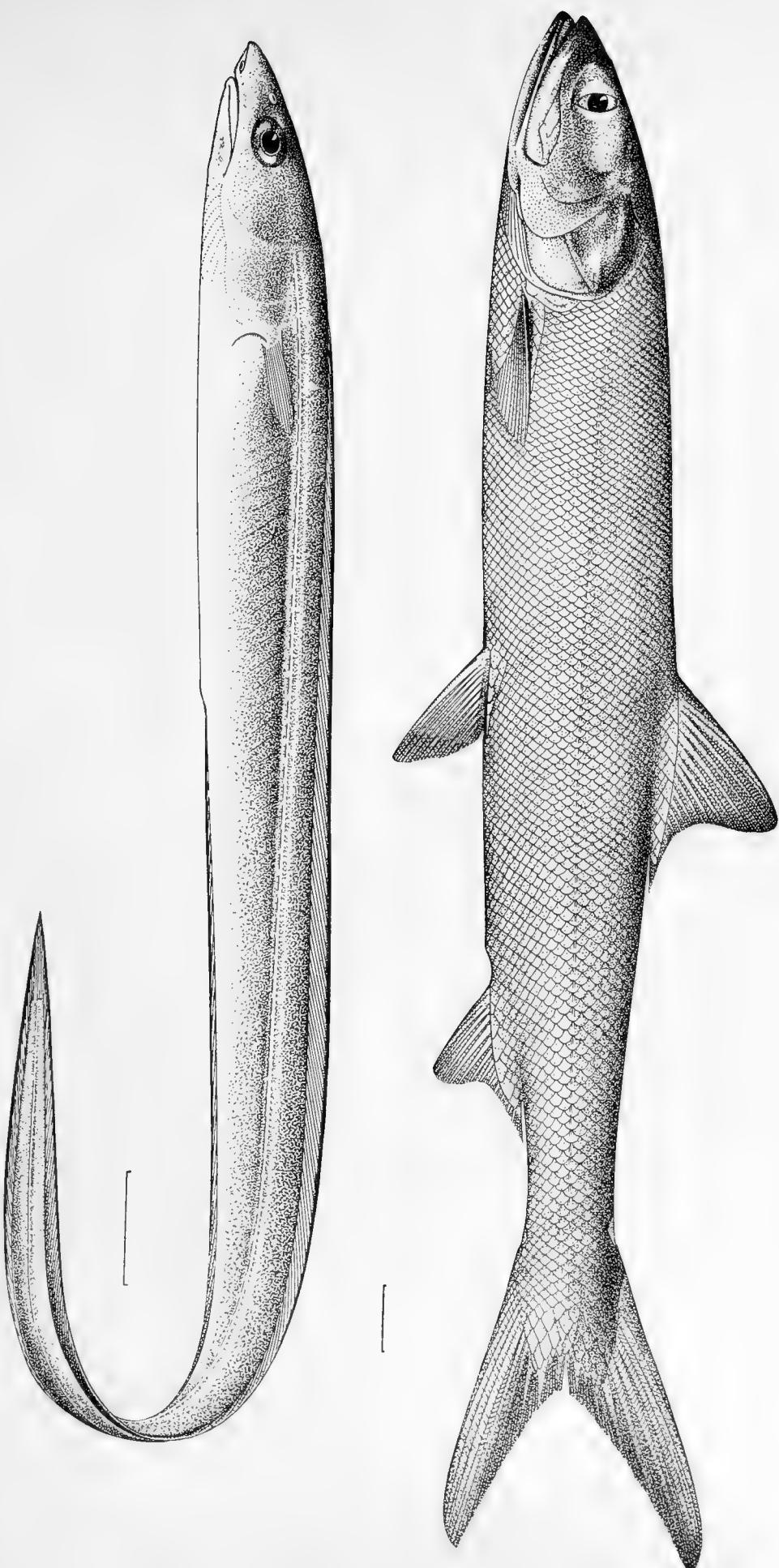
1. *Pristurus sauteri* Jordan & Richardson. (Type.) 2. *Scoliodon walbeeham* (Bleeker).



RAJA HOLLANDI Jordan & Richardson. (Type.)



DASYATIS BENNETTI (Müller & Henle) (?).



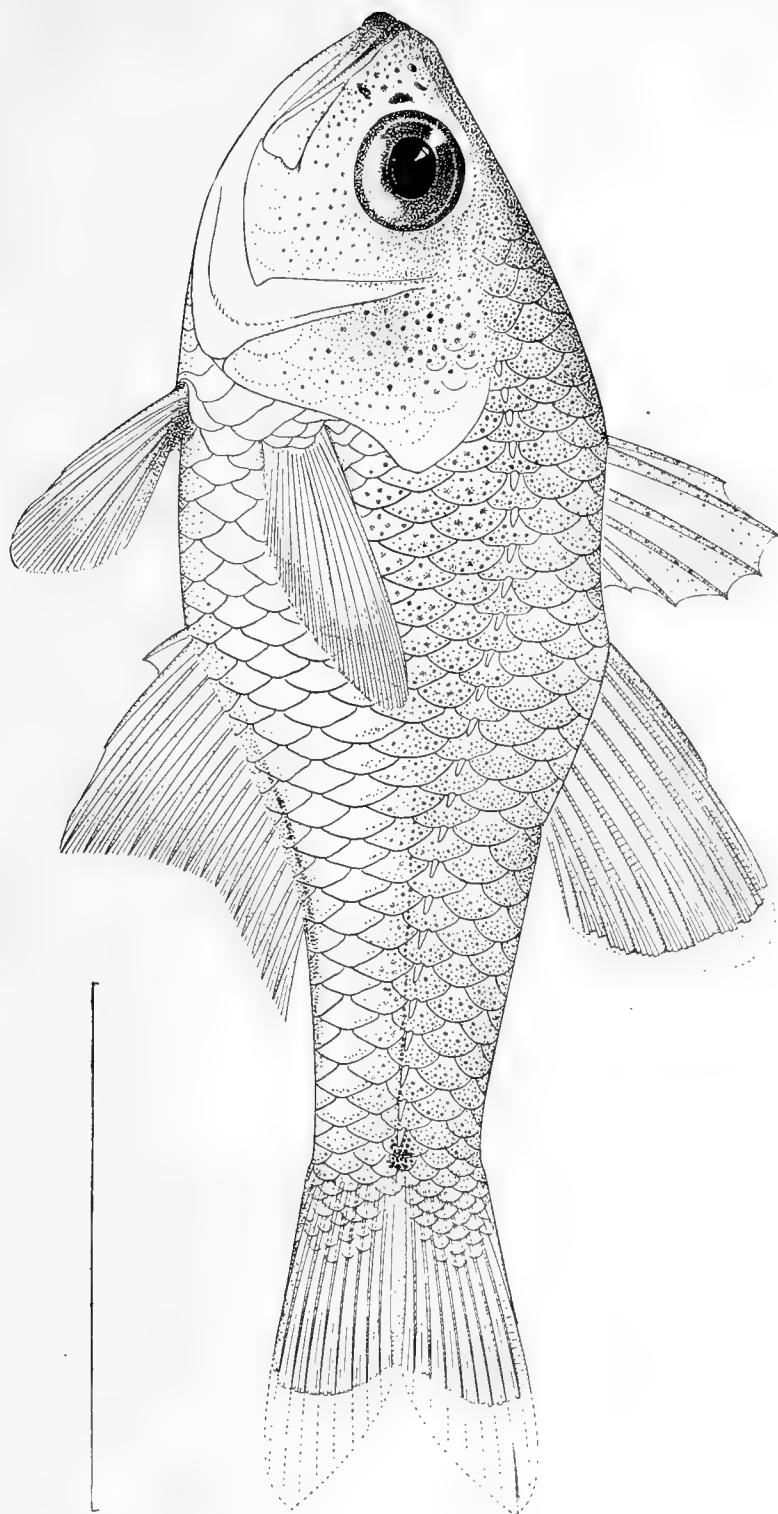
ELOPS HAWAIIENSIS Regan. LEPTOCEPHALUS ECTENURUS Jordan & Richardson. (Type.)

OPHICHTHUS EVERMANNI Jordan & Richardson. (Type.) GYMNOTHORAX MELANOSPILOS (Bleeker).

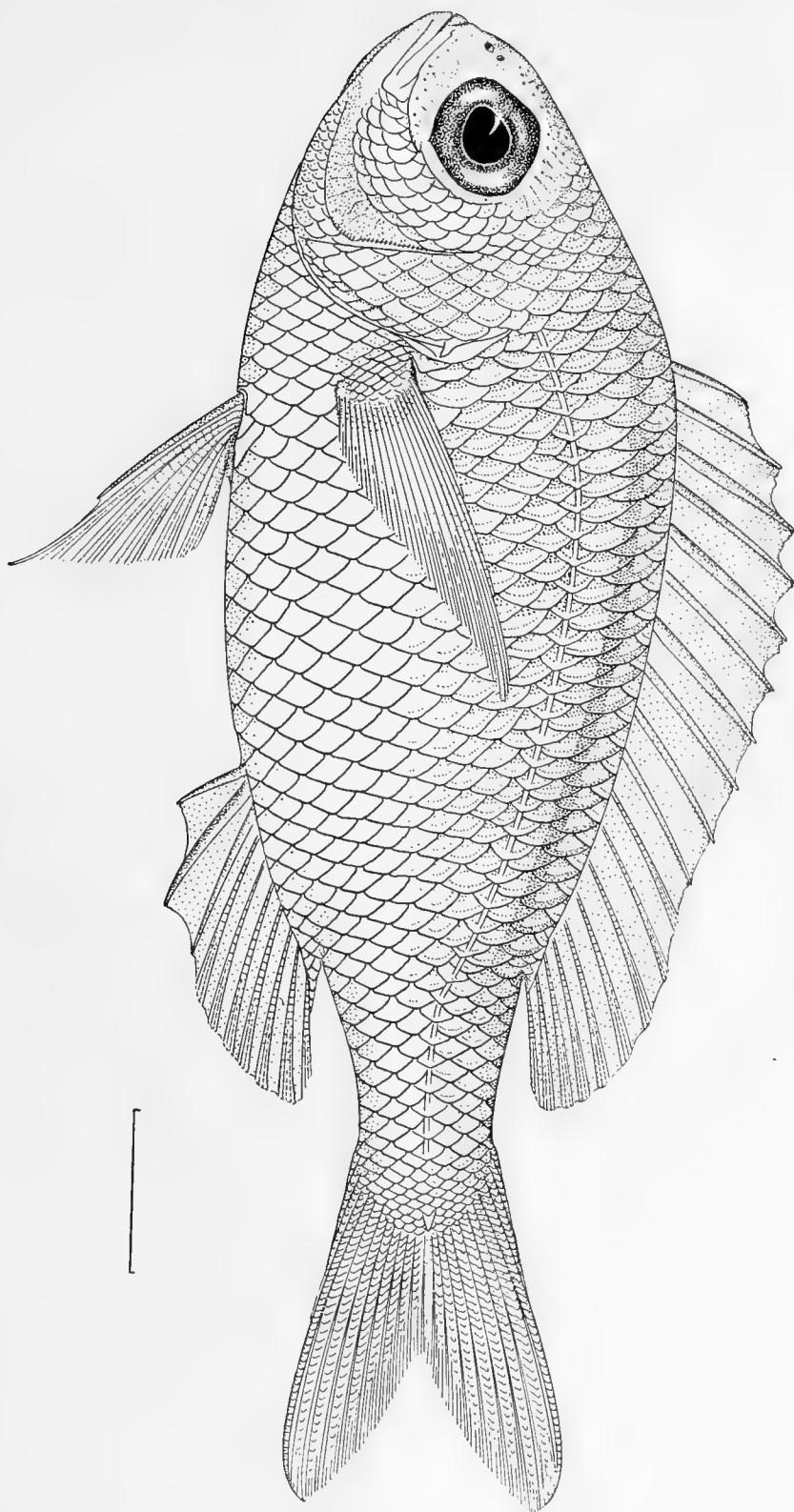




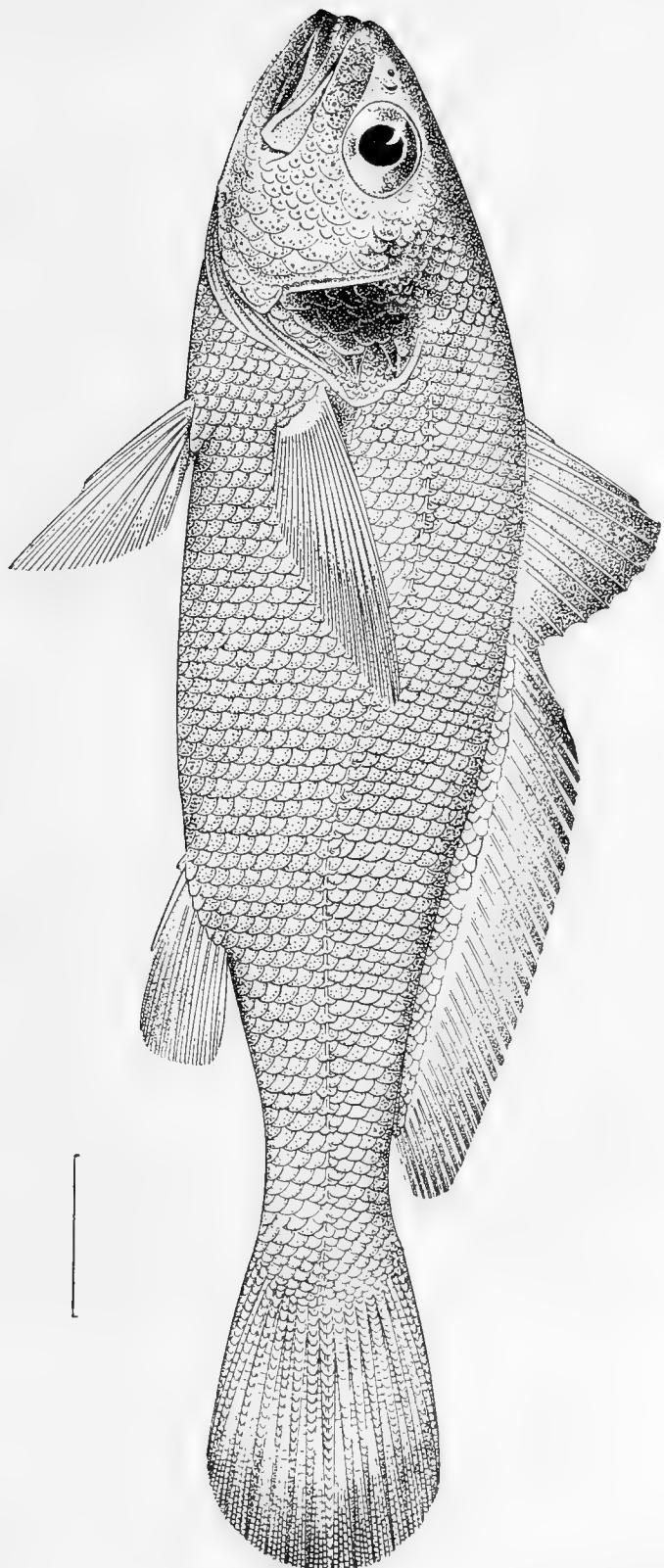
GYMNOThorax LEUCOSTIGMA Jordan & Richardson. (Type.)



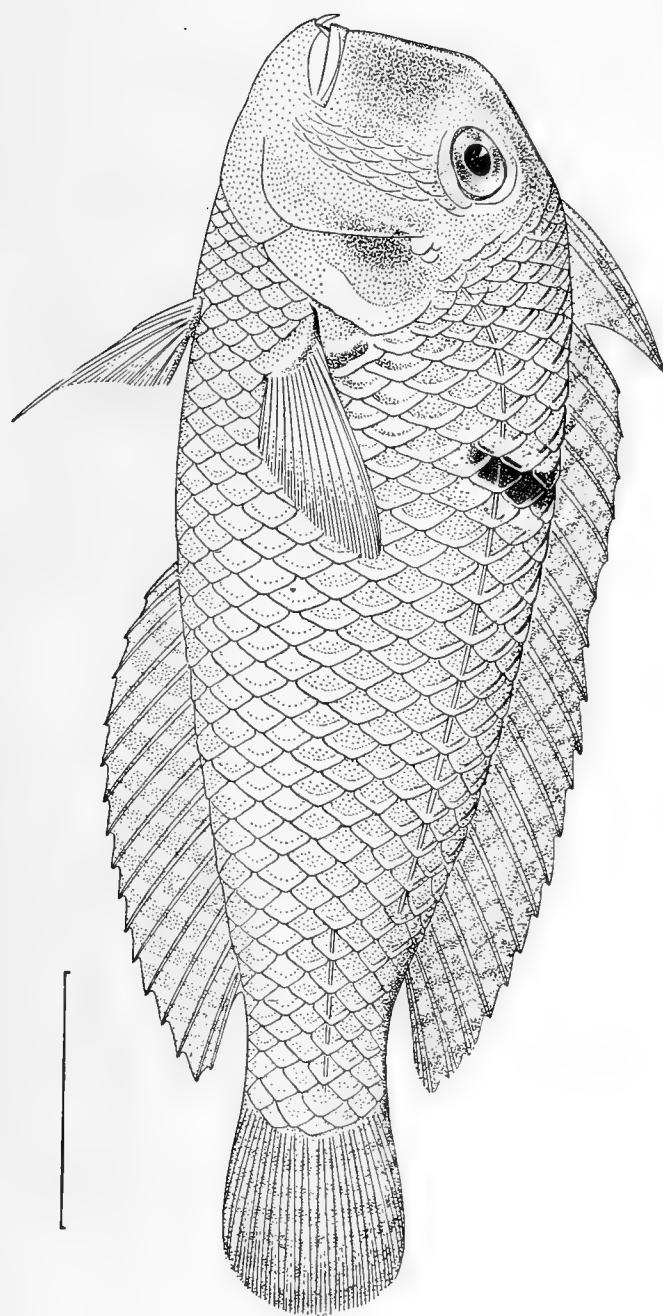
ARCHAMIA NOTATA (Day).



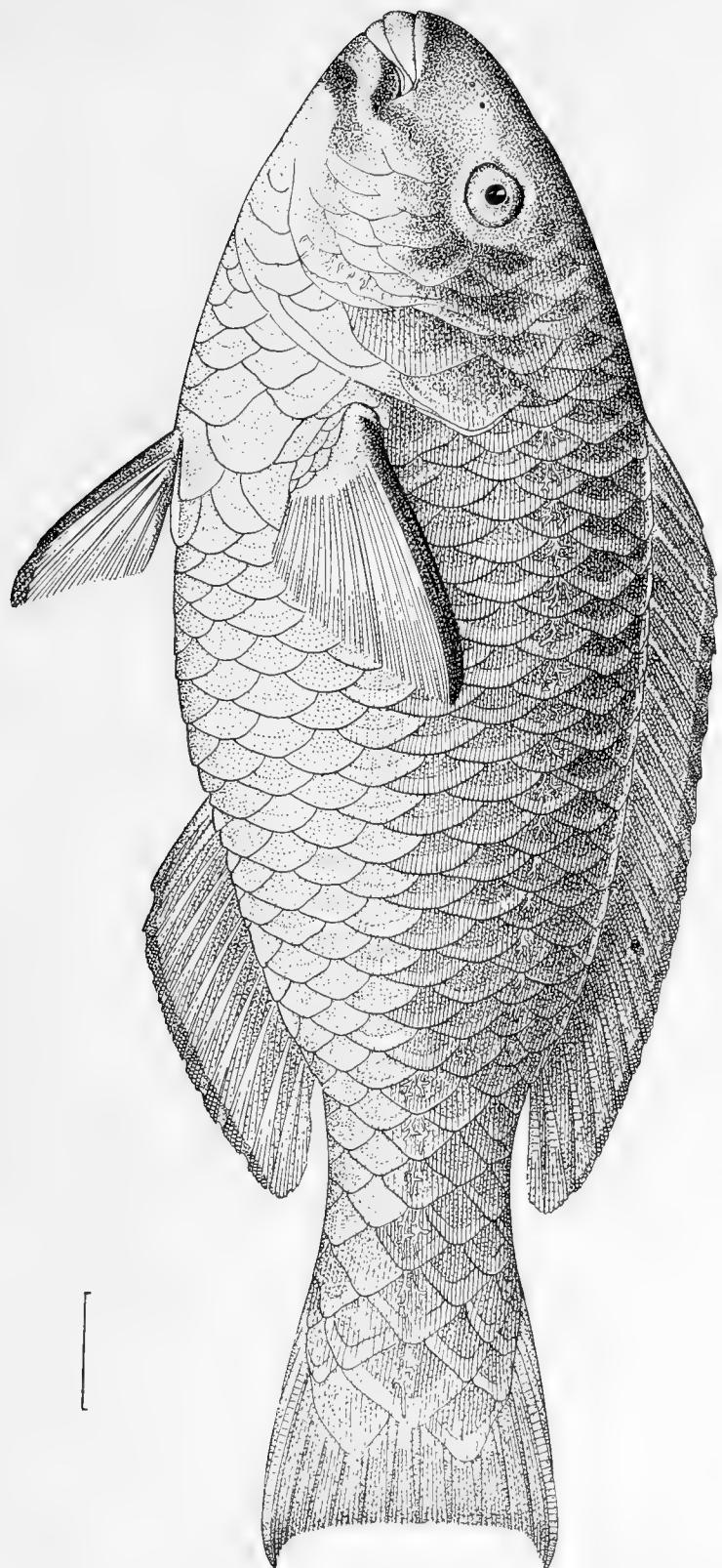
Scolopsis eriomma Jordan & Richardson. (Type.)



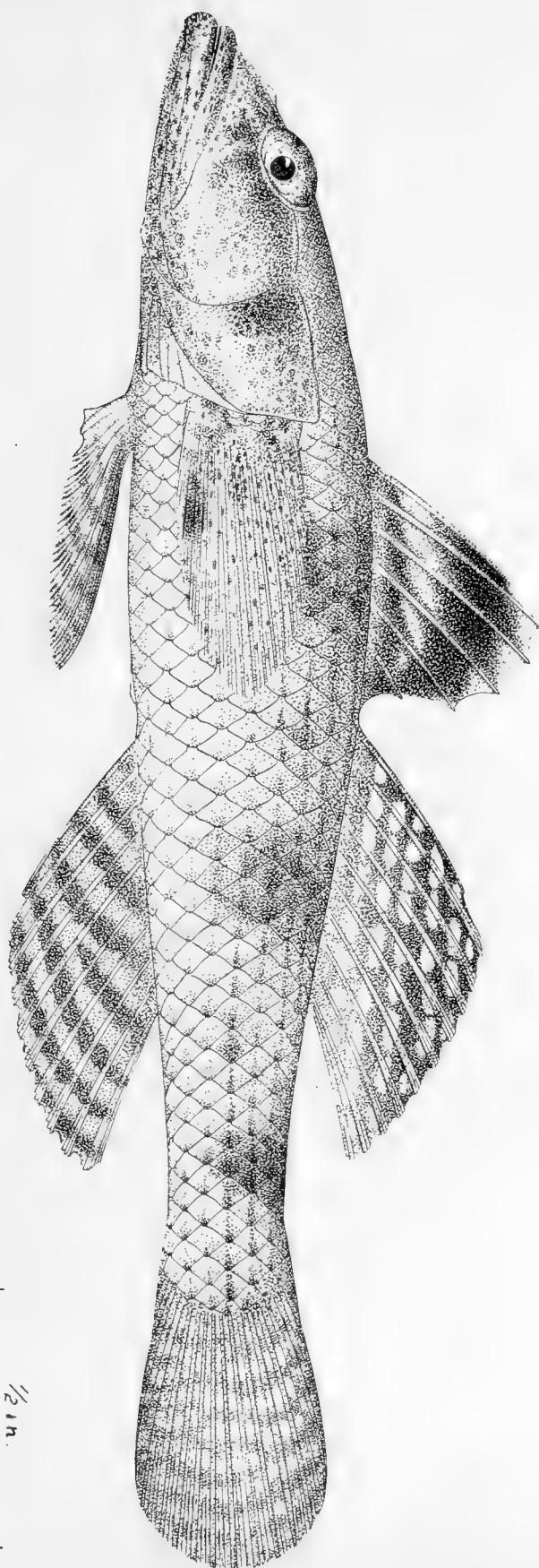
PSEUDOTOLITHUS BRUNNEOLUS Jordan & Richardson. (Type.)



HEMIPTERONOTUS EVIDES Jordan & Richardson. (Type.)



CALLYODON DUSSUMIERI (Cuvier & Valenciennes).



GLOSSOGOBius ABACOPUS Jordan & Richardson. (Type.)



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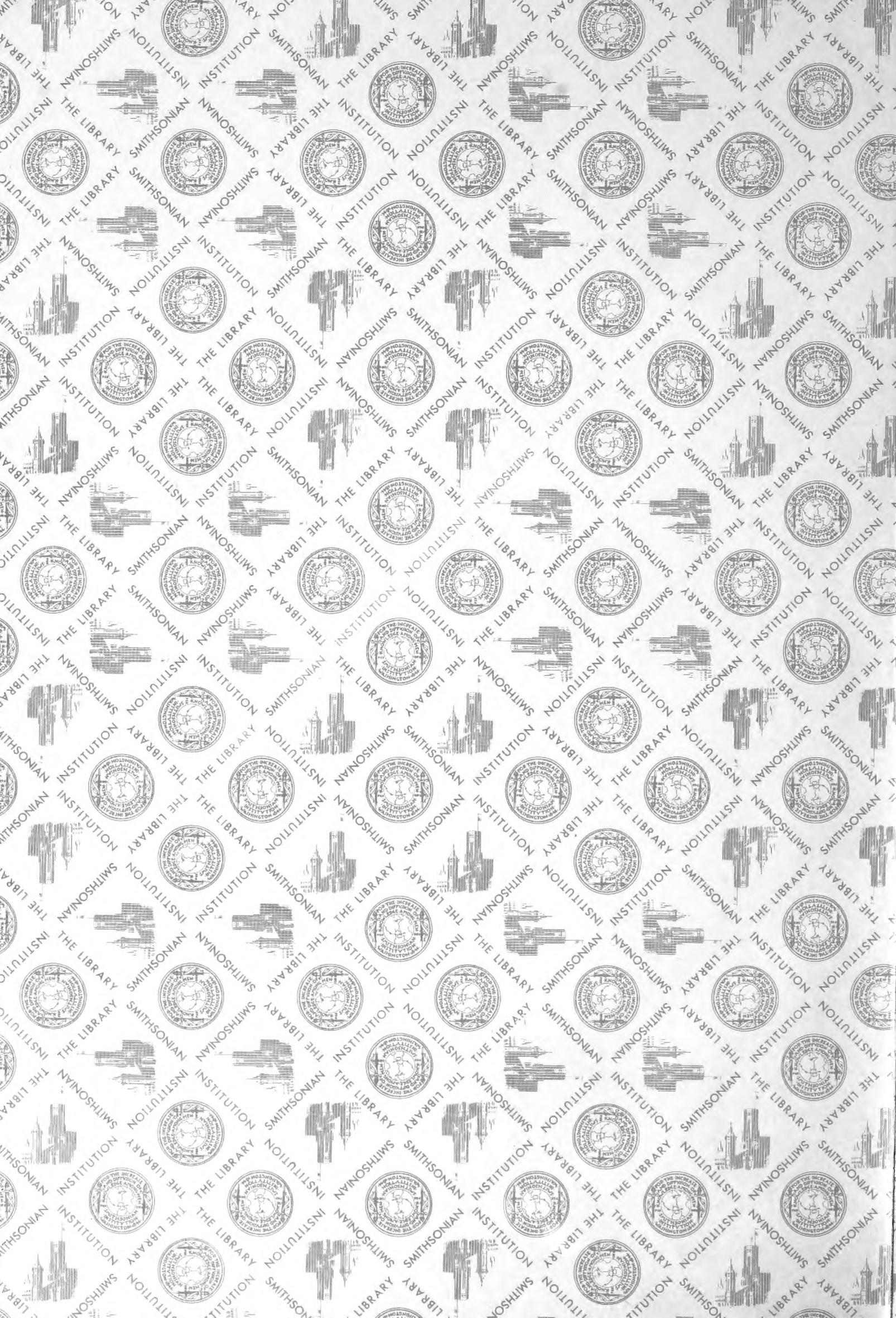
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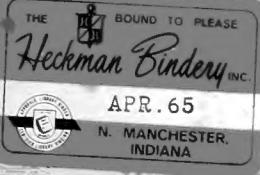
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